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Course Code: WXES 3182

Project Title: Highly dynamic and interactive multimedia learning tool for pre school children incorporated with 3D environment

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Abstract

The LTPC System is a standalone application system that promises a quick and efficient way to access information for system users. The LTPC System is build to provide a learning corner for preschool children and as a teaching method for teacher or parent.

The LTPC System is to practice children in learning environment by using computer technology. It can eliminate traditional teaching method and children can study in anytime and anywhere, as long as have a computer in hand.

The Waterfall Methodology with Prototyping is used to develop the LTPC System. The LTPC System needs special development tools such as Client/Server two-tier system architecture, Windows XP Professional as development platform, 3d studio Max 6, Macromedia Flash MX, Adobe Photoshop7.0, Sound Forge 6.0 and Swift 3D.

Acknowledgement

The development of this LTPC System (Highly dynamic and interactive multimedia learning tools for pre school children incorporated with 3D environment) project was carried along with advices, assistance, contributions and ideas from many individual.

First and foremost, I would like to express my utmost gratitude to my supervisor, Mr. Amirrudin Hj Kamsin for the guidance throughout the development of my project. Not forgetting, my special thanks to Ms. Mas Idayu Md Sabri, my project moderator for spending precious time to moderate this project

Special thanks also go to my fellow course mates, friends and senior for sharing their time and knowledge with me. Their supports and motivations are deeply appreciated. I feel grateful to have their encouragements whenever I encounter difficulty.

Last but not least, I would like to express my heartiest appreciation to my beloved parents and siblings for all their love, moral supports and encouragement throughout this period. Their kindness will always get a special place in the bottom of my heart.

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Chapter 1 Introduction

1.1 Project Overview

Education has been once of the most important element in this area. It is a backbone for a country's future. In Malaysia, the education system stretches from primary school to secondary school until university level. However, we still can't deny the importance of child early education – the pre school.

Pre school children, the children below five year-old and have not entering into primary school to get education. Their daily life routine in playing the toys, watching the cartoons, playing with their brothers and sisters et cetera. As a result, things that are very exciting and interesting can get their attention. Therefore multimedia technologies play a very important role in the pre schools education.

Multimedia is the combination of various digital media types such as text, images, sound, video and animation. Therefore, if the system includes all this digital media types, it must be a very powerful system.

In recent years, many pre schools start using multimedia as a learning tool for children. Anyway to overcome the problems that occur for existing system, a highly dynamic and interactive multimedia learning tool for pre schools children incorporated with 3D environment will be developed – LTPC System.

Since the system is a learning tool for the pre school children, the software that I suggest to use to build this system are Macromedia Flash MX, Swish 2.0,

Adobe Photoshop 7.0, Maya 5.0, 3D Studio Max 6 and others that can produce exciting effects.

The content of the system as a learning tool for the pre school children will be presented in English. The learning subjects in the system include alphabet such as ABC, numbers (123...), shapes and colors, moral, human being's body, family relationship (until 3 generations), arts and music. Moreover, the system will also include a games section. The games can help the children relax besides learning.

1.2 Project Objective

The objectives that consider for building a LTPC System are:

a. Let the children involve in computer world and multimedia technology.
b. Convenience for the children in learning method because it provides them a direct interface learning area. They can learn and get knowledge without teaching by teacher or their parent.
c. Help the children grow up their mind because games will include in the system.
d. This system can as a teaching method because by using multimedia tools, the system will become more attractive. The children can play games besides learning education.
e. To increase the children's computer skills level. Besides that, the English language level also will be increase.
f. Provide the general knowledge for the children.

1.3 Project Scope

As common, the system includes a few scopes. Below are some scopes that have to be considered:

a. **Identify the learning objective**

To build a successful learning system, a few problems have to consider. There are:

- Syllabus that should be included in the system.
- The way to let the pre school children easy to learn education by the system.
- The design of the system.

b. **Specify target user**

This system is specification for pre schools children only. Therefore, it should be not too complex, easy for them to learn the system, direct instruction and more cartoon animation. This can done by using multimedia tool, integrate with 3D models to include inside the system.

c. **Select multimedia tools**

Selecting the right multimedia tools for the system is very important because it can effort the popularity for the system. The learning objective and the target user will be considered during the tools selection.

d. **Select multimedia software**

To develop a system, software plays a very important role. While selecting the software, must careful because it would effort the system work. There is some software that suggests using:

- Multimedia software: Macromedia Flash MX, Adobe Photoshop 7.0, Adobe ImageReady 7.0, Swish 2.0 and Sound Forge 6.0.
- 3D software: Swift 3D, Maya 5.0 or 3D Studio Max 6.

e. Develop content

To developing the system content, first will do some research from Internet and interview kindergarten to get information about the syllabus, problems and doing the survey with the teachers and parents. However, while developing content for the system the objective will be more consider.

1.4 Project Syllabus

The syllabus that includes in the system is:

a. Alphabet

Learn from alphabet A until Z and also learn about the differential of capital letter and small letter. Besides, some simple examples also will be include in syllabus like A stand for ant, axe and aeroplane, then B stand for... Every alphabet will represent by maximum three simple examples that easy to get from environment and the example will be presented in 3D images. The system also provides printing method which the alphabet and examples can printout for writing practice.

b. Numbers

Learn number from 1 until 20. This system will introduce the number by movie clip to present to user. It also provides printing method for the number writing.

c. Shapes / Colors

The main color will be teaches to the children. That is includes: red, yellow, blue, orange, green, purple, brown, pink, black and white. Besides that, the 5 general 2D shapes and 3D shapes also will be presented.

2D shapes: circle, square, triangle, rectangle and oval.

3D shapes: sphere, box, pyramid, cone and cylinder.

d. Moral

Tell the children what the right way is, for example must be honest, don't be selfish, don't wasteful so on. This system will presented 10 of the moral examples.

e. Human Being's Body

Let the children know about the general human parts like part of head, hand, leg, and arm.

f. Family Relationships

The children will learn about their family members like: grandfather, grandmother, father, mother, sister and brother.

g. **Art**

A few pictures will be provided to let children coloring. However a drawing pad will be prepares to let children drawing inside there.

h. **Music**

Provide a few kid songs and follow by the song story or lyric. The children can follow to sing together.

i. **Story Telling**

A few stories will be prepared. Each story present by a little text and related images, so that it can easy to attract the children.

1.5 Problems of Statement

In Malaysia, using multimedia as learning tools for pre schools children still not popular even though the primary schools or secondary schools. But in foreign country, teaching by using multimedia learning tools as a teaching method for pre schools children are start popular especially for Sweden, Finland, Portugal and United Kingdom. Malaysia still not popular in it because many teachers or parent are no experience in computer skills. There are also less products selling in the market. Besides that, the teaching method that exists now very boring, therefore it encourages me to build a system that can solve all the problems that mention above. While having this system, children no needs to bring heavy beg which includes difference subject of books to schools already because all the information that want to present to the children are inside the system.

1.6 Target User

This system is specifying build for pre schools children as a learning method. Therefore the content of the system must be suitable for pre schools children. The content that includes in the system must easy to understand, learn and not complex by the children. The interface of the system also must be more cartoon animation, including sound, 3D images and many more to attract the children attention. By the way, in the system will have a complete syllabus which suitable for the pre schools children level.

1.7 Project Schedule

In order to timely achieve project objectives, a project schedule is planned rationally to manage the time taken for each task. The following series activities will be carried out.

1. Introduction
2. Literature Review
3. Methodology
4. System Analysis
5. System Design
6. Prototyping
7. Development and Coding
8. Unit Testing
9. System Testing
10. Documentation

Each step will be conducted in different phase and path. Some of the phases can be overlapped and some of them cannot. Figure below present the project schedule of LTPC System.

ID	Task Name	Start	Finish	Duration
1	Introduction	6/25/2004	7/8/2004	10d
2	Literature Review	7/9/2004	7/29/2004	15d
3	Methodology	7/26/2004	8/13/2004	15d
4	System Analysis	8/16/2004	8/30/2004	15d
5	System Design	8/20/2004	9/15/2004	19d
6	Prototyping	9/16/2004	9/29/2004	10d
7	Development and Coding	9/30/2004	1/12/2005	75d
8	Unit Testing	1/5/2005	1/18/2005	10d
9	System Testing	1/10/2005	1/28/2005	15d
10	Documentation	1/25/2005	2/14/2005	15d

Figure 1-1: Project Scheduling

1.8 Report Layout

This project proposal report consists of five chapters. The purpose of this layout is to give overview of the major phases involved during development of the project. Below are the report layouts:

Chapter 1 : Introduction

This chapter gives an overview of the major phases of the project that includes the objective, project scope, syllabus and project schedule.

Chapter 2 : Literature Review

This chapter gives brief explanation on topics researched and studies that are relevant to this project. It is the combination between literature search and literature review.

Chapter 3 : Methodology

This chapter emphasizes on the justifications for the chosen project methodology. It also discusses the information gathering techniques and the explanation about the development software and platform chosen to develop this system.

Chapter 4 : System Analysis

This chapter describes the system analysis of the project including functional requirements, non-functional requirements, hardware and software requirements on different developing tools. It also explains how the requirements for this project were acquired.

Chapter 5 : System Design

This chapter explains the conceptual and technical design of the system. It covers the structure chart, data flow diagram, process flowchart and user interface.

1.9 Chapter Summary

This chapter focuses mainly on the introduction of this project. A brief introduction and definition are stated in the first part of this chapter, which is the Project Overview. Apart from that, relevant information and topics are also being discussed consequentially. Topics included are Project Objectives, Project Scope, Project Syllabus, Problems of Statement, Target User, Project Schedule and Report Layout. The research and development of this proposed system will take about 8 months.

The next chapter literature review will carried out whereby current systems are surveyed to better understand how it is implemented, together with comparisons between different operating system platforms, development tools, databases and others.

Chapter 2 Literature Review

This chapter is about the review on problem that will occur, existing system review, technologies involved in the application development and other relevant tools that needed in the development. This chapter plays a significant role to the software requirement and decision of tools that needed in the project development. The fact finding based on actual software documentation, articles, related books and Internet.

2.1 Acronyms and Terminology

Below are some terminology and acronyms for my system:

1. **Dynamic**

   Based on Oxford Advanced Learner's English-Chinese Dictionary, **dynamic** brings the meaning as:

   i. Power or forces that produce movement.
   ii. (Of a person) energetic and forceful.
   iii. Force that produces change, action, or effects.

2. **Interactive**

   Based on Oxford Advanced Learner's English-Chinese Dictionary, **interactive** brings the meaning as:

   i. With something (of two or more people or things) interacting.
   ii. Allowing a continuous two-way transfer of information between a computer and the person using it.

3. **Multimedia**

Based on the URL: http://www.glasshaus.com/Glossary.asp, **multimedia** brings the meaning as:

i. Using a computer to present multiple types of media simultaneously, in an integrated manner. These can include sound, graphics, video, text, animation, or any other form of information representation.

Based on URL: http://www.tedhaynes.com/haynes1/atol.html, **interactive multimedia** brings the meaning same as "An application involving substantial user input or control and presenting at least two of the following: text, graphics, sound, image, video, and animation. Applications can be in the areas of education, entertainment, information and publishing, and transactions".

4. **Learning**

Based on Oxford Advanced Learner's English-Chinese Dictionary, **learning** brings the meaning as:

i. Knowledge obtained by study.

5. **Tool**

Based on Oxford Advanced Learner's English-Chinese Dictionary, **tool** brings the meaning as:

i. Instrument held in the hand and used for working on something.

ii. Anything used to do or achieve something.

As the entire meaning combined together, **learning tool** brings the meaning same as "instrument that used to do or achieve the knowledge obtained by study".

6. **Pre school**

Based on Oxford Advanced Learner's English-Chinese Dictionary, **pre-school** brings the meaning as:

i. Of the time or age before a child is old enough to go to school.

7. **Children**

Based on Oxford Advanced Learner's English-Chinese Dictionary, **children** brings the meaning as:

i. Young human being below the age of puberty (boy or girl).

ii. Son or daughter (of any age)

iii. Unborn or newly born human being (baby)

As the entire meaning combined together, **pre school children** brings the same meaning as "boys or girls who's below the age of puberty that old enough to go to school".

8. **Incorporate**

Based on Oxford Advanced Learner's English-Chinese Dictionary, **incorporate** brings the meaning as:

i. Make something part of a whole; include.

ii. Have something as part of a whole.

iii. Formed into a corporation; incorporated.

9. 3D

Based on URL: 137.224.135.82/glossary/glossary_all.asp, 3D is standing for three-dimensional and it brings the meaning as:

i. A description of an entity in terms of three spatial dimensions. Generally these three dimensions are represented as x, y, and z co-ordinates.

10. Environment

Based on Oxford Advanced Learner's English-Chinese Dictionary, **environment** brings the meaning as:

i. Conditions, circumstances, etc affecting people's lives.

2.2 Current Available System

In Malaysia, the LTPC System still fresh. We can see a lot of this system software in the market which mostly import from foreign countries. A research has been conducted to find more information about the existing system. I found a lot of this functional system in the Internet also. Below is some web site which related with my system that I found:

1. ABC TOON CENTER (http://www.abctooncenter.com)
2. Kaboose Funschool (http://games.funschool.com)
3. Gayle's Preschool Rainbow (http://www.preschoolrainbow.org/index.htm)
4. Preschool Learners (http://www.boowakwala.com)

2.2.1 ABC TOON CENTER

URL:

http://www.abctooncenter.com

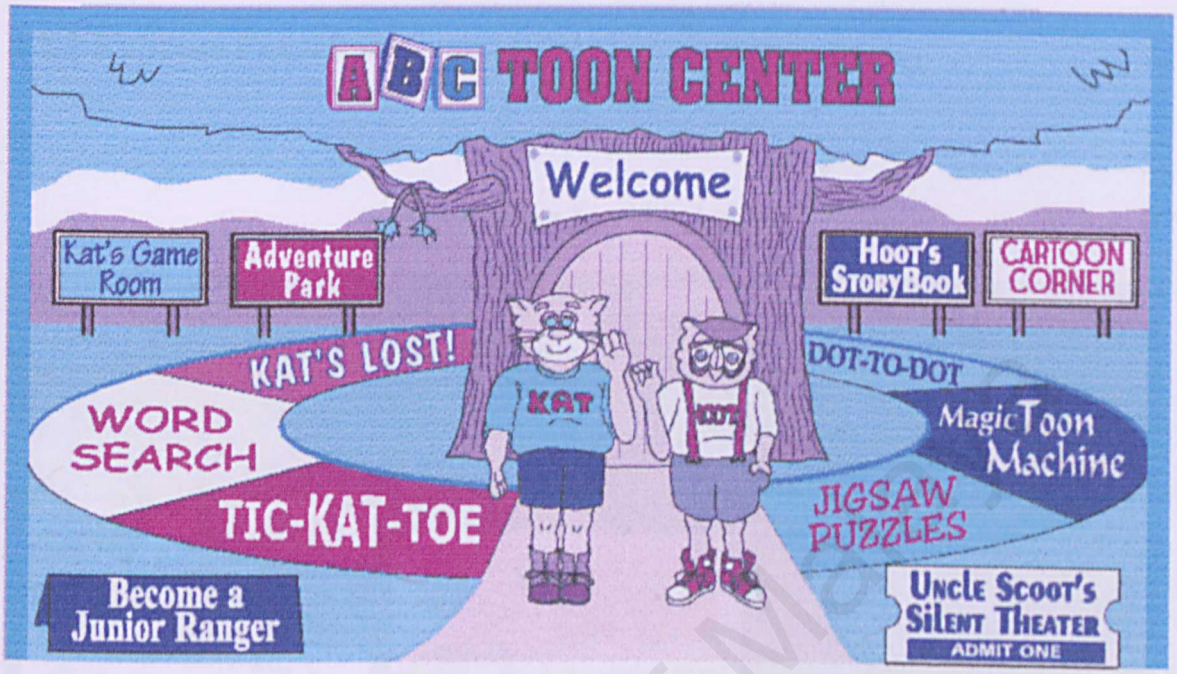


Figure 2-1: ABC TOON CENTER Screen Shot

The ABC TOON CENTER contains information about:

1. Games Corner
2. Cartoon Corner
3. Story Corner
4. Silence Theater
5. Adventure Park
6. Magic Show

Figure 2-1 shows that the ABC TOON CENTER screen shot. This page uses sharp colors cause the page more attractive. The colors that show in the page are red, green blue, yellow, purple, brown and white. Beside that, the picture is also cartooness.

This page also provides some link. In addition, the font that using for text also suitable for the page.

2.2.2 Kaboose Funschool

URL:

http://games.funschool.com

Figure 2-2: Kaboose Funschool Screen Shot

The Kaboose Funschool contains information about:

1. Pre School Learning Corner
2. Games

3. Alphabet Corner

4. Number Corner.

Figure 2-2 shows that the Kaboose Funschool screen shot. The background design for the page uses dark sharp blue to attract the user attention. The text of this page is readability. The buttons are suitable and easy to understand. However the pictures in the page are less and the spacing of the page is not fully utilized.

2.2.3 Gayle's Preschool Rainbow

URL:

http://www.preschoolrainbow.org/index.htm

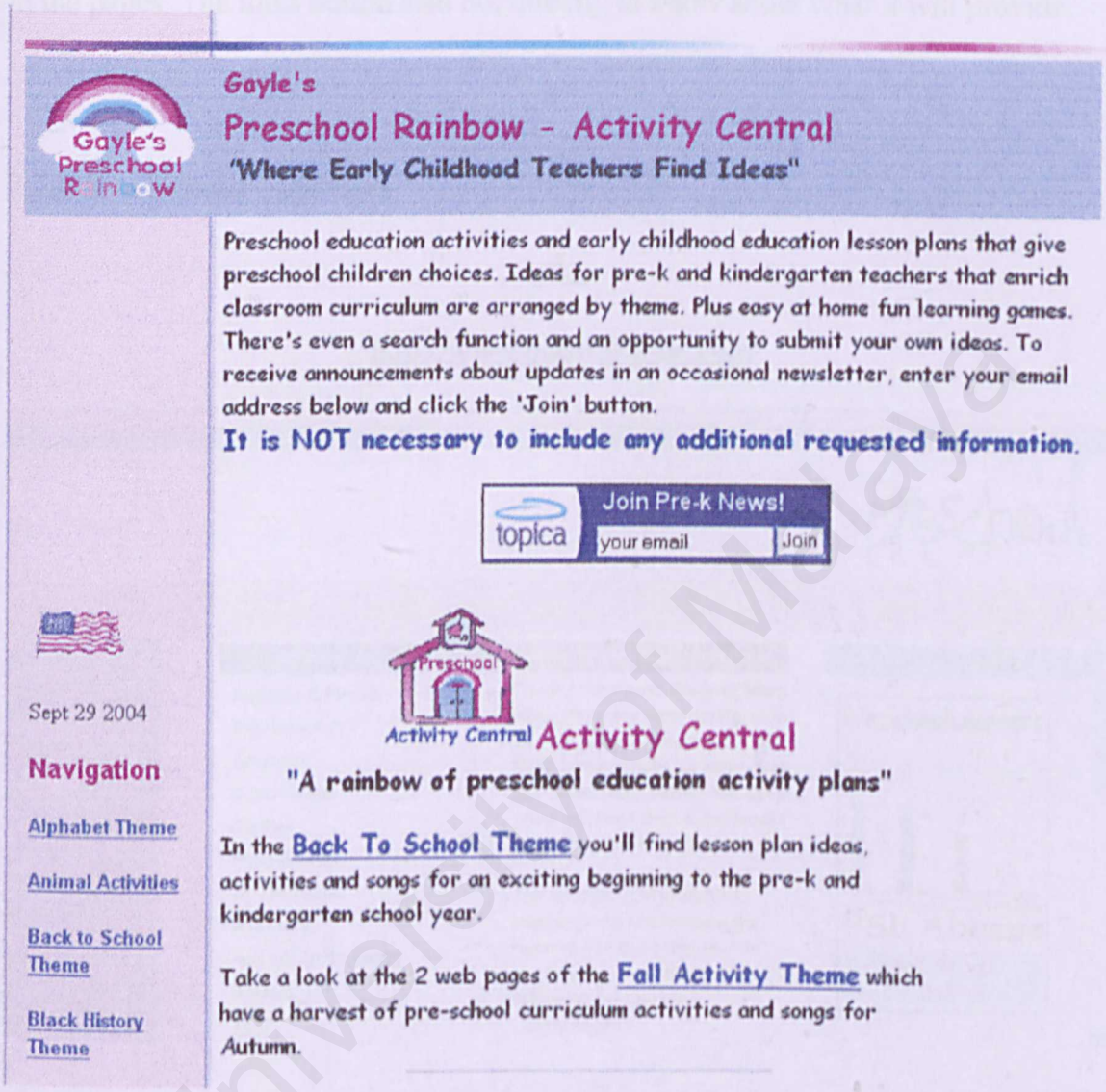


Figure 2-3: Gayle's Pre School Rainbow Screen Shot

The Gayle's Pre School Rainbow contains information about:

1. Early Childhood Ideas
2. Alphabet Theme
3. Animal Activities
4. Nursery Rhythm

Figure 2-3 show Gayle's Pre School Rainbow screen shot. The system is less attractive because the pages background used white color and the text are in black color so overall it is looks like very bored. Beside that, there are also fewer pictures in the pages. The links button also not directly to know about what it will provide.

2.2.4 Pre School Learners

URL:

http://www.boowakwala.com

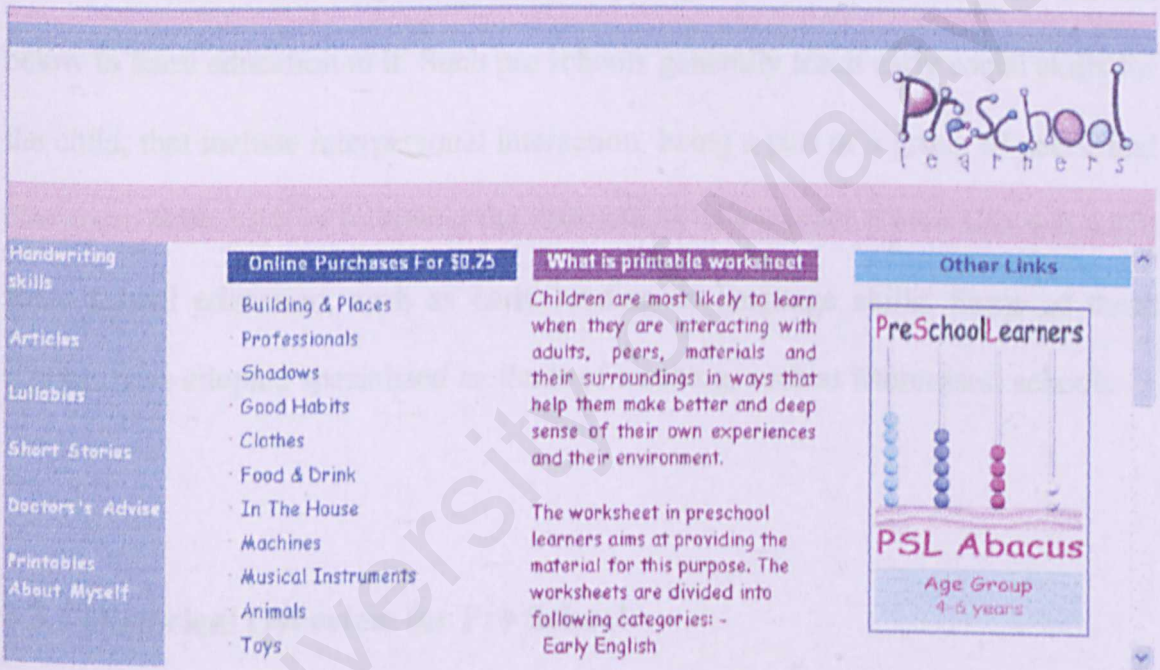


Figure 2-4: Pre School Learners Screen Shot

The Pre School Learners contains information about:

1. Handwriting Skill
2. Articles
3. Short Stories
4. Doctor's Advice
5. Lullabies
6. Printable About Myself

Figure 2-4 shows the Pre School Learners screen shot. The background color for the page used sharp color to attract the user attention. There are also including a lot of other information in the system. However this system presented too much text until the user feels boring. Beside that, the links should be support by picture so that user easy to make their choice.

2.3 Pre School

Pre school, a nursery school, for the young children whose six years old and below to learn education in it. Such pre schools generally teach early social skills for the child, that include interpersonal interaction, being a part of a group of peers, and classroom skills such as following the instructions of a teacher. There also will teach some formal education, such as early reading or language skills. Some of these schools have adopted specialized methods of teaching, such as Montessori schools.

2.3.1 Historical Overview for Pre School

The first pre-schools were established in the 1820's by a private initiative with a view to receiving the children of working families, where both parents worked outside the home. During the period between 1850 to 1900, private educational institutions appeared which were open on a part-time basis. These institutions had pedagogical objectives and were aimed at the children of the more privileged classes.

In 1919, the Danish state allocated a subvention to institutions with a social vocation. The social reform of 1933 made it possible for these institutions to receive

up to 50% of their operational expenditure from the state. From that time on, the state and the municipalities have gradually obtained the biggest financial and pedagogical responsibility for the administration of these institutions.

In 1949, a subvention was also made available for those institutions which had not been entitled to it until then, as they did not meet the conditions of the act to the effect that they were to cater for the children of disadvantaged families. The pedagogical objective of the institutions was thus recognized.

An act of 1964 obliged the authorities to make all public services available to all citizens. The right to pre-school education was also emphasized in the Social Assistance Act of 1976, which demanded that the municipalities create the necessary infrastructure to meet the needs of families.

In 1987, the state delegated the responsibility for the financial administration of the pre-school institutions to the municipalities. [1]

2.3.2 Early Childhood Education

Education in the second half of the twentieth century has been characterized by increases in the provision of educational programs for preschool-age children. The largest wave of preschool education activity has been the federally funded Head Start program, established in the 1960s [2]. It was established to help children overcome the cognitive, social, emotional, and physical deficits that frequently accompany growing up in economically deprived homes. This kind of pre-school normally providing an array of educational and social services to children and their

families, which designed to foster general well-being and enhance school readiness, so that these children might gain the full benefit of their school experiences and be more successful in life generally.

One-fourth of all children under the age of six are living in poverty, and that three-fifths of the mothers of three- and four-year-old children now work outside the home. However, fewer than 20 percent of the nation's three and four-year-olds from poor families are currently enrolled in Head Start programs [3].

In addition to the generally recognized need to provide some kind of extra support to children from low-income homes, there is another reason for the dramatic increase in educational programs for children before first grade. This is the increase, alluded to above, of mothers in the workforce. Many parents who are not at home with their children in the daytime are not satisfied with unstructured day care or babysitting, preferring that their children participate in more formal learning experiences.

Many educators and researchers view early childhood education as beneficial to children's cognitive and social development. These proponents-including virtually all of the researchers and theorists whose work was consulted in order to prepare this document--base their conviction on personal observation and on the many research studies linking early childhood programs to desirable outcomes. National Association for the Education of Young Children [4] warn against too much formal, highly structured education for very young children. These and other writers have called attention to three major objections to school-based programs, these objections include:

- Such programs, because they are to be conducted in schools normally serving elementary-age children, will inevitably adopt formal academic teaching methods that early childhood specialists generally consider developmentally inappropriate for under-six-year-olds.
- Research reporting positive long-term benefits of early education programs is based on the kind of high quality of staff and program implementation unlikely to be duplicated in most school districts.
- Others...cite the special risks of public school programs for young children, suggesting that such children need comprehensive programs that include health, nutrition, social services, and parent involvement, as well as informal curriculum/methods.

In addition, the issues surrounding the half-day/full-day kindergarten controversy have to pay attention. Because the additional hours are too fatiguing for young children and that, in any case, increasing allocated time does not necessarily enhance program quality [5].

2.4 Multimedia

Multimedia is the use of several different media to convey information (text, audio, graphics, animation, video, and interactivity). Multimedia also refers to computer media.

As the information is presented in various formats, multimedia enhances user experience and helps grasping information better and faster.

Presenting information in various formats is nothing new to human beings, but multimedia generally implies presenting information in various digital formats. Although it is also used in visual arts to describe works created using more than one medium.

Multimedia finds its application in various areas including, but not limited to, education, entertainment, engineering, medicine, mathematics, and scientific research.

In education, multimedia is used to produce Computer Based Training courses (popularly called CBTs), reference books like encyclopedias and alamanacs.[6]

A CBT lets the user go through a series of presentation, text about a particular topic and associated illustrations in various information formats.

An electronic multimedia encyclopedia can present information in better ways than a traditional encyclopedia can. So the user has more fun and learns fast.

Multimedia is heavily used in the entertainment industry, especially to develop special effects in movies and animation for cartoon characters. Multimedia games, which are software programs available either as CD-ROMs or online, are a popular pastime. Some video games also use multimedia features.

Multimedia applications that allow users to actively participate instead of just sitting by as passive recipients of information are call interactive multimedia. An example is interactive multimedia games.

For instance, a user can play a simulated multimedia soccer match without actually being in the ground. The simulation is just an illusion, but it makes the user think that they play a real match. The environment is created by using many equipments of control like headset, goggles, joystick, sensors and by coordinating various multimedia components with a technique called virtual reality. They provide an environment which is experienced by users as similar to reality. This technique is used in some arcade games and also in flight simulators, to import training to pilots, without having to go for a real flight.

In engineering, especially in Mechanical and Automobile Engineering, multimedia is primarily used for designing a machinery or automobile. This lets an engineer view a product from various perspectives, zoom critical parts and do other manipulations, before actually producing it.

In medicine, doctors can get trained by looking at a virtual surgery or they can simulate how human body is affected by diseases spread by viruses and bacteria and then develop techniques to prevent the same.

In mathematical and scientific research, multimedia is mainly used for modeling and simulation. For example, a scientist can look at a molecular model of a particular substance and manipulate it to arrive at a new substance.

In the arts we can talk about multimedia artists, when we come across those minds able to blend techniques using different media that in some way incorporates interaction with the viewer.

2.4.1 The type of Multimedia

There are 5 types of media included in the multimedia application, there are: video, audio, graphics/images, animation and text.

2.4.1.1 Video

Digital video is a type of video system that works by using a digital representation of the brightness and color of each pixel of the image. Black and white digital video is also possible.

Video is the technology of processing electronic signals representing moving pictures. A major application of video technology is television, but it is also widely used in engineering, scientific, manufacturing, and security applications. Other uses of video have tended to use the video formats designed for television use.

Videotape replaced film as the favored medium for sharing moving pictures with others, and its little wonder: it's cheap, consumer-quality equipment is easy to use, and the results can be viewed instantly. In business, video's usefulness is taking a long time to be seen. Large companies invest vast amounts of money in promotional, educational and informational videos, money which is typically handed to professional video production houses. But advances in technology have made it possible for anyone with the right equipment and software to create their own videos.

The most recent advances provide us with a choice we previously didn't have: analogue or digital. Analogue video is simply, videotape. The highest-end-digital video is recorded on tape as well but as a digital signal. When applied a video,

a moving video signal is digitalized, stored on a computer's hard disk and played back later.

2.4.1.2 Audio

Audio is the processing of a representation of auditory signals, or sound. The audio is represented by digital or analog signal. Usually the electrical signal is represented an analog audio while a digital audio is representation expresses the pressure wave-from as a sequence of symbols, usually binary numbers. An analog is a voltage level represents the air pressure waveform of the sound.

The focus in audio signal processing is most typically an analysis of which parts of the signal are audible. For example, a signal can be modified for different purposes such that the modification is controlled in the auditory domain. Which parts of the signal are heard and which are not, is not decided merely by physiology of the human hearing system, but very much by psychological properties. These properties are analyzed within the field of psychoacoustics.

Processing methods and application areas include storage, compression, transmission, enhancement (e.g., equalization, filtering, noise cancellation, echo removal or addition etc.), source separation, sound effects and computer music.

2.4.1.3 Graphic

When the Color Graphic Adapter first became available for the original IBM PC, pundits scoffed, insisting that no serious computer user needed color or graphics.

Color graphics languished for some years as the domain of scientists and game players, but with the introduction of the EGA and VGA on the PC, the Amiga 1000 in which color graphics were standard, and the first color Macs, color began to earn a well-deserved reputation as a useful tool for serious users. Now many programs take for granted that they're running on color displays and even text-mode programs make liberal use of color to present data more clearly.

Graphics play a key role in bringing computers closer to human-style communication. Where humans rely on facial expression and body language, computers can employ graphics to communicate an unspoken message.

There are a few categories of graphics; that are two dimension (2D) graphic and three dimension (3D) graphic which are used most in the environment.

i. 2D Graphic

2D computer graphics is the computer-based generation of digital images—mostly from two-dimensional models (such as 2D geometric models, text, and digital images) and by techniques specific to them. 2D computer graphics are mainly used in applications that were originally developed upon traditional printing and drawing technologies, such as typography, cartography, technical drafting, advertising, etc.. In those applications, the two-dimensional image is not just a representation of a real-world object, but an independent artifact with added semantic value; two-dimensional models are therefore preferred, because they give more direct control of the image

than 3D computer graphics (whose approach is more akin to photography than to typography).

ii. 3D Graphic

3D computer graphics are works of graphic art that were created with the aid of digital computers and specialized 3D software. In general, the term may also refer to the process of creating such graphics, or the field of study of 3D computer graphic techniques and its related technology.

3D computer graphics are distinct from 2D computer graphics in that a three-dimensional virtual representation of objects is stored in the computer for the purposes of performing calculations and rendering images. In general, the art of 3D graphics is akin to sculpting or photography, while the art of 2D graphics is analogous to painting. In computer graphics software, this distinction is occasionally blurred; some 2D applications use 3D techniques to achieve certain effects such as lighting, while some primarily 3D applications make use of 2D visual techniques.

2.4.1.4 Animation

Animation is the art of creating moving images via the use of computers. It is a subfield of computer graphics and animation. Increasingly it is created by means of 3D computer graphics, though 2D computer graphics are still widely used. Sometimes the target of the animation is the computer itself; sometimes the target is another medium, such as film.

To create the illusion of movement, an image is displayed on the computer screen then quickly replaced by a new image that is similar to the previous image, but shifted slightly. This technique is identical to how the illusion of movement is achieved with television and motion pictures.

2.4.1.5 Text

In language, text is something that contains words to express something. The term usually has broader meaning.

In linguistics text enters at least two types of contrasts. One is that between system and text, system being understood as the ability of the speakers to communicate using verbal signs, and text being understood as the product of this ability. The other is between text, understood as written text, and speech, spoken text. In Literary Theory a text is the object being studied, whether it be a novel, a poem, a film, an advertisement, or anything else with a linguistic component. The term came into use with the rise of cultural studies, and the corresponding broadening of what it was one could talk about when talking about literature. [7]

2.4.2 Virtual Reality

Virtual Reality is a set of computer technologies which, when combined, provide an interface to a computer-generated world, and in particular, provide such a convincing interface that the user believes he is actually in a three dimensional computer-generated world. This computer generated world may be a model of a real-

world object, such as a house; it might be an abstract world that does not exist in a real sense but is understood by humans, such as a chemical molecule or a representation of a set of data; or it might be in a completely imaginary science fiction world.

A key feature is that the user believes that he is actually in this different world. A second key feature of Virtual Reality is that if the human moves his head, arms or legs, the shift of visual cues must be those he would expect in a real world. In other words, besides immersion, there must be navigation and interaction.

2.4.3 Applications of Multimedia

There are many multimedia applications in existence today that, to one degree or another, touch the lives of everyone. As a simple example, the TV broadcast of the centennial Olympic Games employed the digital multimedia network technology. More sophisticated technologies and their applications will inevitably change many facets of our lives. The following is only a very brief introduction to some of the applications that exist today.

2.4.3.1 Multimedia in Education

The use of multimedia in industries has been extensive, as it has been effective in increasing productivity and retention rates, where research has shown that people remember 20% of what they see, 40% of what they see and hear, but about 75% of what they see and hear and do simultaneously [8]. This is especially significant in the CBT (Computer-Based Training) modules in corporations like

Ernst & Young, and Union Pacific, where employees are trained in organizational procedures and in flight simulations in the aviation industry to train pilots. It is now permeating the educational system as a tool for effective teaching and learning [8]. With multimedia, the communication of the information can be done in a more effective manner and it can be an effective instructional medium for delivering information. A multi-sensory experience can be created for the audience, which, in turn, elicits positive attitudes toward the application. Multimedia has also been shown to elicit the highest rate of information retention and result in shorter learning time [8]. On the part of the creator, designing a multimedia application that is interactive and multi-sensory can be both a challenge and a thrill. Multimedia application design offers new insights into the learning process of the designer and forces them to represent information and knowledge in a new and innovative way.

Multimedia is changing the way we communicate with each other. The way we send and receive messages is more effectively done and better comprehended. The inclusion of media elements reinforces the message and the delivery, which leads to a better learning rate. The power of multimedia lies in the fact that it is multi-sensory, stimulating the many senses of the audience. It is also interactive, enabling the end-users of the application to control the content and flow of information. The evolution of multimedia has made it very possible for learners to become involved in their work. With multimedia technologies, we can create multimedia applications as part of their project requirements. This would make us active participants in our own learning process, instead of just being passive learners of the educational content.

2.4.4 The Important of Multimedia

At the present time, numerous multimedia applications and services are available. However, this rapidly advancing multimedia technology is continuously spawning new products and applications, and their emergence will have a significant impact on a large number of people from all walks of life. Furthermore, those affected will range in age from young school children to practicing professionals, and encompass such activities as education, entertainment, health care, religion, sales and a host of other business applications. The development of a global view of multimedia computers, the related communication, and the tremendous variety of this technology's applications permits one to use it in an efficient and effective manner for career enhancement or simply enjoying life.

This important and constantly evolving area comprises a number of technologies, which include multimedia computers, compression and multimedia network as well as the transport mechanisms for these networks. The standards and technology for multimedia and multimedia communication are evolving at a prodigious pace, and staying abreast of the wide spectrum of this rapidly advancing area of technology is indeed quite challenging.

2.5 Technology Review

2.5.1 Standalone Application System

Standalone application is system that runs locally on the users' computer. The whole application resides in the user's computer that does not connect to other

computer. The data are not shared with other computers. Either developer will have to distribute the application or users will have to download it from a specific website. The hard disk, printers and other hardware connected to a stand-alone computer can only be utilized through the computer they are connected to and inaccessible to other computer. Therefore, the distribution of the system is rather flexible. Systems can be written into compact discs, flash drives, zip drives etc.

The advantages of standalone application are:

- Resides totally on the users' computer
- Independent and works without any technical limitations
- Various ways of distribution are supported
- No server side programming required
- Information can be in multiple format

The disadvantages of standalone application are:

- Software update requires redistribution
- Dependent on practical limitations (hard disk size)
- Requires installation on the users' computer

2.5.2 System Architecture

System architecture exist to provide organizations flexible and robust infrastructure that, depending on how they are design, can cater the specify business needs. Below is description of different system architecture environments:

2.5.2.1 Client-Server Architecture

Client-server architecture is a distributed system model which shows how data and processing are distributed across a range of processors. In this approach, the system may be thought of as a set of services that provided to clients are treated differently in these system. The 'client' is allowed to request service from the server and the 'server' gives the services to clients. This approach has the ability to present the information to the user via a graphical user interface (GUI).

Pros: shared data environment, ideal of small business.

Cons: software control, software deployment and poor performance

2.5.2.1.1 Client-Server 2-tier

The two-tier architecture partitioned into two logical layers: the front-end and the back-end. The front-end process is developed in a 4GL and allowed the user interacts on their personal computer. However, the back-end process is a database server and it is typically resides on a centralized server machine in a centralized environment.

2.5.2.1.2 Client-Server 3-tier

Client/Server three-tier drive a logical division of the application components, the database component, and the business rules that govern the processes the application supports. It provides an explicit layer for the business rules that sits between front-end and back-end. It also encapsulates the business model associated with the system and separates it form the presentation and database code.

2.5.3 Application Platform

Application platform is served as a platform that for developer to develop their system. Below is some operating system in the market:

Operating System	Unique	Reload	Total	Share	Graph
Windows 98	117,796	77,470	195,266	55.84%	
Windows 2000 / XP	47,576	35,597	83,173	22.55%	
Other/unknown	16,818	8,910	25,728	7.97%	
Windows 95	9,287	6,802	16,089	4.40%	
Windows ME	8,302	7,864	16,166	3.94%	
Windows NT	8,248	5,596	13,844	3.91%	
Linux 2	1,567	598	2,165	0.74%	
MacOS	1,014	278	1,292	0.48%	
Unix/unknown	32	3	35	0.02%	
OS/2	3	0	3	0.00%	

Table 2-1: Statistic of Operating System

Resources from URL: http://counter.search.bg

2.5.3.1 Unix

UNIX is an operating system that originated at Bell labs in 1969 as interactive time-sharing system. It is a freeware product with many extensions and new ideas provided in variety of UNIX by different companies, university and individuals. It is not a proprietary OS owned by any computer companies and it is the first open or standard OS that could improved by anyone. UNIX includes the traditional operation system components. It has functions that manage the hardware and the executing of application separately.

Pros:

a. powerful and motivate OS
b. it is a network-based platform.
c. Consistent way to manage files and users no need learn special command to every new task.

Cons:

a. It is too expensive to use because it need a very powerful workstation.

2.5.3.2 Linux

LINUX is UNIX-like as that was designed to provide personal computer users a free or very low cost OS compare to traditional and usually more expensive UNIX system. LINUX including graphical user interface, an X window system, TCP/IP, the Emacs editor, and other component usually found in a comprehensive UNIX system. LINUX is publicly open and extendable by contributors. Because it conforms to the portable operation system interface standard user and programming interface, developers can write program that can be ported to other OS.

Pros:

i. It is stable
ii. It is developed under General Public License (GNU) and its source code is freely available to everyone.

Cons:

i. inherently unsafe because very malicious cracker in the universe has the source code to the web site that developer under LINUX

ii. it is developed by people world-wide then lack proper organized support.

2.5.3.3 Windows NT

Microsoft Windows NT is one of the leading OS in the internet and intranet. It is comprises of two products: Microsoft NT Workstation and Microsoft NT Server. It is more safe that Windows 95 and Windows 98. It has faster performances therefore can fulfill business users.

Pros:

i. Minimal changes of system need to run a different hardware platform.

ii. Support SMP

iii. It could be easily expanded on by writing to a well defines Application Programming Interface (API)

iv. Could easily be ported to run in numerous different languages and writing system with minimal modification to the software.

v. Including of Microsoft Internet Information Server.

Cons:

i. required licensed fee.

2.5.3.4 Windows 2000

Windows 2000 is a very good representative of its kind, the changes, both fundamental and cosmetic have made Windows 2000 server faster, more reliable, heavier duty and easier to use. It has an operating system directory service which provides the means to record and organize the resources of a network (people, computer and peripherals, control their security, and monitor their operation.

Pros:

i. Active directory and the services is enables.

ii. Improved performance, reliability, and security.

iii. Better administrative facilities.

iv. Allows Object Linking and Embedding (OLE)

Cons:

i. Cost of planning and implementation, especially for mid-size organization that must use Active Directory.

2.5.3.5 Windows XP Professional

Windows XP Professional is the latest version of the Windows desktop operating system. It is the next client and server-based OS. It is built on the Windows 20000 kernel but bring a new, more personalized look to the desktop. With the strengths of Windows 2000 Professional and the best business features of Windows 98, Windows XP Professional is the best desktop OS for all size of business.

Pros:

i. Most reliable version.

ii. Can restore a computer to a previous state without losing data.

iii. Increased application compatibility and latest hardware standards support

iv. It is easier to deploy and maintain the browser.

v. Improve handling of file associations

vi. More stable and improved troubleshooting tools.

Cons:

i. need large hard drive space (around 1 GB)

ii. Need high system specification to eliminate support for device driver which are not approved by Microsoft.

iii. High costly operating system.

2.5.4 Authoring Tools

2.5.4.1 3D Studio Max 6

3D Studio Max is one of the most powerful, robust and rich features 3D modeler in the market, with the extensive range of modeling technique and user friendly GUI (Graphic User Interface) which makes 3D Studio Max 4 the tools for both beginner and expert. 3D Studio Max is a full 3D modeler, equip with vast number of plug in which makes an imagination comes more reality than ever. Basically, there is almost nothing than can be imagined and cannot be modeled by 3D Studio Max.

3D Studio Max is build with following features: Character animation, Advanced Skinning, Bones(Shaded Volumetric Bones System), Inverse Kinematics solvers, Flex, View port Manipulators, Parameter Wiring Game Development features, Customs Attributes, Polygon Modeling, Hierarchical Subdivision Surface Modeling, Advanced Bezier Modeling, Active Shade, and better Raytracing.

2.5.4.2 Sonic Foundry Sound Forge

Sound Forge is an audio editor that includes a powerful set of audio processes, tools, and effects for recording and manipulating audio. This application is the professional's choice for audio editing, audio recording, effects processing, streaming-content creation, and more.

Sound Forge 7.0 continues to build on its decade-long legacy by adding features that make it more powerful than ever to enhance the work flow and productivity. These include DirectX plug-in effects automation; automated time-based recording and audio-threshold record triggering; enhanced spectrum-analysis tools; white-, pink-, and brown-noise generators; clipped peak detection and marking; Media Explorer; project-file creation and much more.

2.5.4.3 Adobe Photoshop 7.0

Adobe Photoshop is a state-of-the-art tool with its comprehensive set of retouching, painting, drawing, and Web tools, Photoshop complete any image-editing task efficiently. And with features like the History palette and editable layer effects, which allow user to experiment freely without sacrificing efficiency.

Photoshop is a technical tool, for advance user, it can almost create any texture, any 2D image and can finely retouch on a photo. As Photoshop become more robust and rich features in every latest released, which makes it the best image editing software in the market.

2.5.4.4 Paint Shop Pro

Paint Shop Pro is software for creating professional digital-imaging results. By combining automatic and precision tools with an integrated learning system, Paint Shop Pro helps you produce professional results.

With the power of Automated Productivity Scripts and Dynamic Personalization, Paint Shop Pro increases productivity and enhances work flow. It including new suite such as Art Media features, professional photo-editing tools, and precision graphic-design capabilities.

With a smorgasbord of tools for working with digital photos and creating illustrations, Paint Shop Pro clearly has lofty intentions. However, this application shares a few minuses found in similar full-featured image programs.

2.5.4.5 Macromedia Flash MX

Macromedia Flash MX is an application that provides new video capabilities, enhanced color management, timeline layer folders, and an optimized workspace with a context-sensitive Property inspector. Flash MX gives application developers

access advanced scripting and debugging tools, built-in code reference and Flash components to rapidly deploy rich Web applications.

In Flash MX, ActionScript is a very important language to let the application developers to add interactivity to a movie. ActionScript provides elements, such as actions, operators and objects, that put together in scripts that tell the movie what to do. Scripts can consist of a single action, such as instructing a movie to stop playing, or a series of actions, such as first evaluating a condition and then performing an action.

2.5.4.6 VRML (Virtual Reality Modeling Language)

VRML is an open, extensible, industry-standard scene description language for 3D scenes, or worlds, on the Internet. With VRML user can author and view distributed, interactive 3D worlds that are rich with text, images, animation, sound, music, and even video. VRML supports worlds with relatively simple animations, complex 3D animations, simulations, and behaviors by allowing Java and JavaScript programmers to write scripts that act upon VRML objects.

2.6 Analysis

2.6.1 Benefit of using Multimedia as a Learning Tools

- Children can learn and active in thinking at young age.
- Children can improve the skill of cognitive that needed for knowledge synthesis since young.

- Can increase the skill of solving problems.
- Achievement of information at anytime.
- Can get knowledge and sharpen the computer's skill.

2.6.2 Weakness of Exist Systems

- Although the software that used to create the application is powerful, the result is depended on the individual involved, such as children, parent commitment and responsible teachers.
- Limited achievement: the application is limited to those has computer.
- The application cannot satisfy each individual because of the different range of level, for example, financial limitation to prepare each house a computer.

2.6.3 Suggestions

The software designed is trying to improve the previous software by improve the previous weakness and enhance the quality of the application. For example:

- User friendly
- Interactive to improve user understanding
- User is free to access the desired module
- Stress on presenting and learning aspects
    - Short and easy understanding message
    - Clear pronunciation
    - Interesting theme and background
    - Attractive and suitable color-match

2.7 Chapter Summary

This chapter is mainly focus on the research of the problem encountered before project can be done. Through literature review on various aspects, many ideas have been gained to develop the proposed system. By reviewing the existing system that match the proposed system, the strong features gave some ideas to enhance the proposed system. Review on tools and methods were also carried out. Development tools and other useful technology need to be considered in order to develop a quality and useful system.

Chapter Three is the research on the methodology and techniques that used to gain information.

Chapter 3 Methodology

Methodology is the study of methods or a body of method on developing something. It may be defined as a collection of procedures, techniques, tools and documentations aids. These help the software developers to speed up and simplify the software development process and as a guideline to develop a well standardize software. A methodology consists of a set of phases that may consist of sub-phases in which will important in guiding the developers to the choice of techniques at various stages in the project. In short, a methodology helps the developers to plan, control and evaluate information system project.

There are several types of development model in software engineering, for example: waterfall model, V-model, prototyping model, incremental model and spiral model. The first three examples are the basic models while incremental model and spiral model are usually used in large project.

3.1 Development Model

Managing software engineering projects is tough. The body of methods, rules, postulates, procedures, and processes that are used to manage a software engineering project are collectively referred to as methodology [9]. This will ensure a proper documentation on the work and tasks need to be carried out. Waterfall Methodology will be used to develop this system.

3.1.1 Waterfall Model

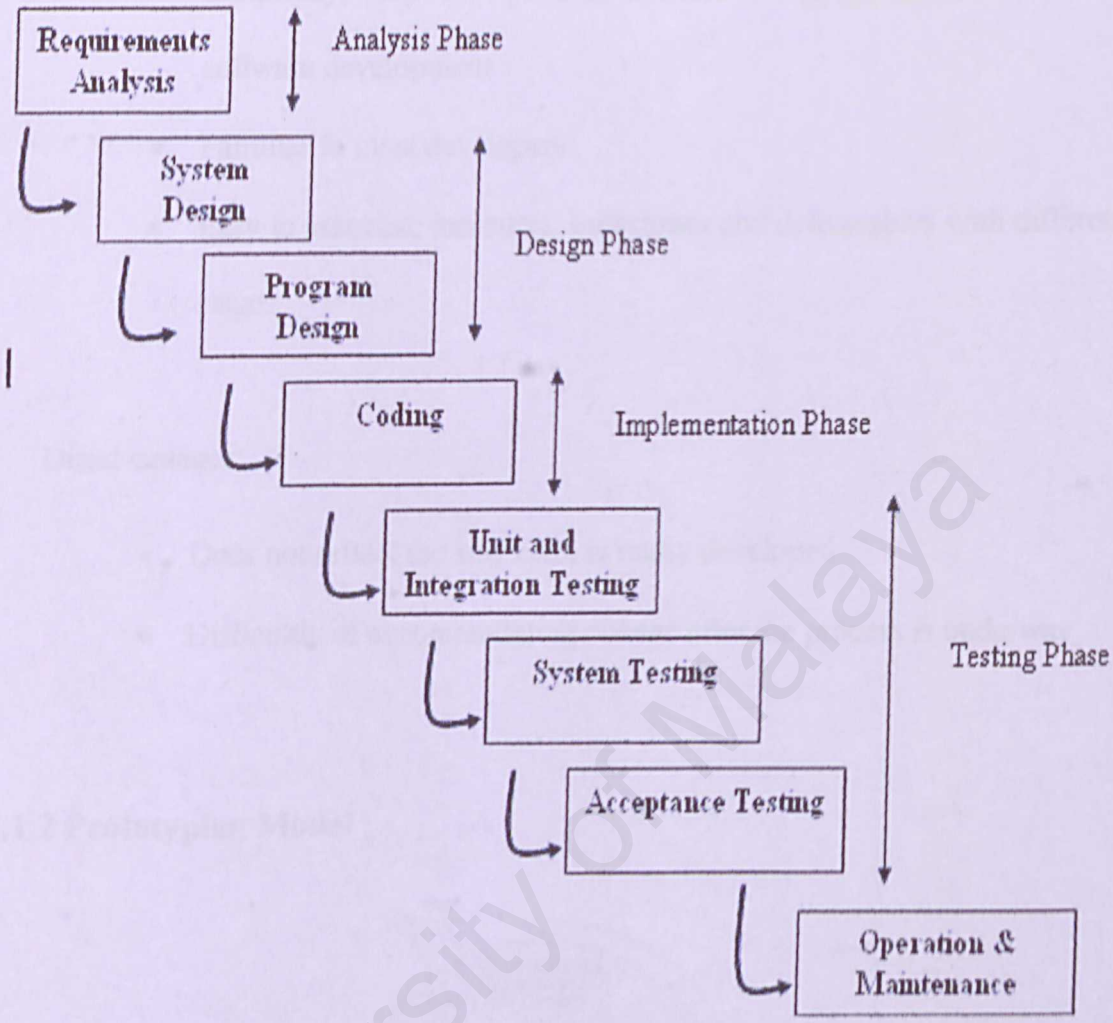


Figure 3-1: The Waterfall Model [9]

Waterfall model is a development model in which one development stage should be completed before the next begin. It is attributed with providing the theoretical basis for other process models, as it most closely resembles a "generic" model for software development. The waterfall model presents a very high-level view of what going on during development and it suggests to developers the sequence of events they should expect to encounter. [9]

Advantages:

- Simplicity, easy to explain to customers who are not familiar with software development
- Familiar to most developers
- Easy to associate measures, milestones and deliverables with different stages

Disadvantages:

- Does not reflect the way code is really developed
- Difficultly of accommodating change after the process is underway

3.1.2 Prototyping Model

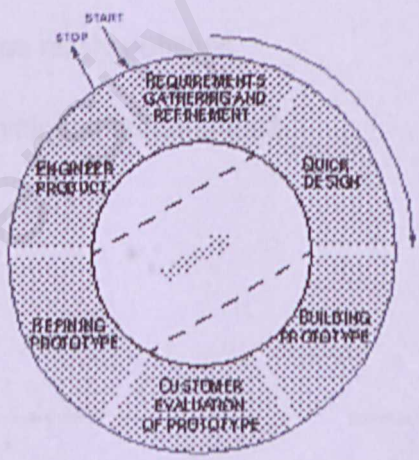


Figure 3-2: The Prototyping Model

Resource from URL: http://www.ludd.luth.se/users/no/os_meth.8.html

The prototyping model was developed on the assumption that is often difficult to know all the users' requirement at the beginning of a project. It offers a development approach that yields results without first requiring all information up-

front. When a prototype is create, it is reviewed by the customer to give feedback to the developers that helps improve the prototype or built new prototype.

Advantages:

- End-users become more active participant in the system development (user oriented)
- More opportunities to change
- Fast development time
- Requirements definition is simplified through realization

Disadvantages:

- Demands high cooperation between user and developer
- No proper documentation
- Prototypes are rarely polished
- Software developed is less robust

3.1.3 V-Model

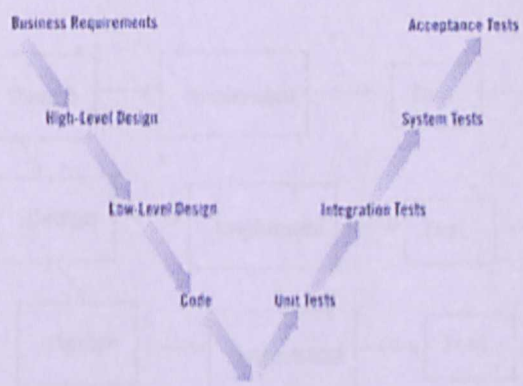


Figure 3-3: The V-Model

Resource from URL: http://www.sdmagazine.com/documents/s=7360/sdm0208e/

The V-Model is an improved version of waterfall model that demonstrates how the testing activities are related to analysis and design. Coding started from the point of the V and the V proceeds from left to right, depicting the basic sequence of development and testing activities. The V-Model emphasizes in highlights the existence of several levels of testing and depicts the way each relates to a different development phase.

Advantages:

- Users are involved in the testing
- Makes more explicit some of the iteration and rework that are hidden in the waterfall depiction
- Better spells out the role of different types of testing

Disadvantages:

- May not be cost-effective for extensive testing

3.1.4 Increment Model

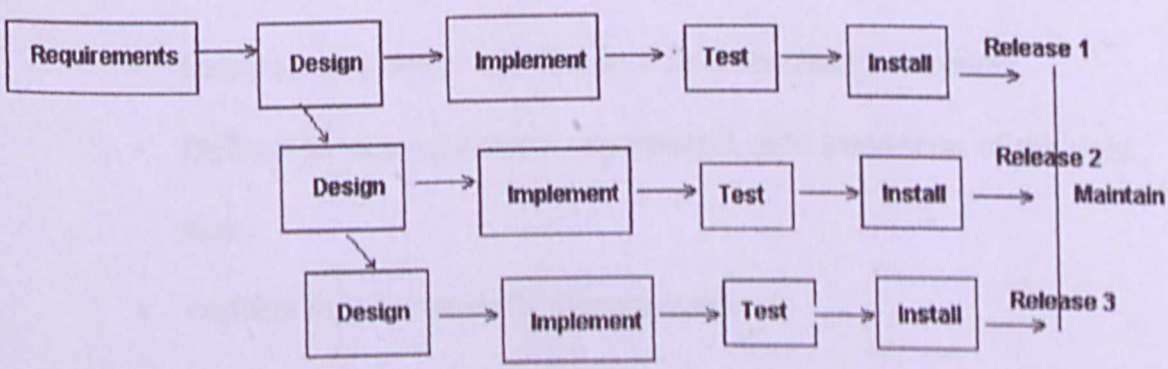


Figure 3-4: The Increment Model

Resource from URL:

http://www2.umassd.edu/CISW3/coursepages/pages/CIS311/Lecturemat/process/lifecycles/lifecycles.html

Incremental model partitions the system into subsystems by functionality. The release is defined by beginning with one small, functional subsystem and then adding functionally with each new release. [10] In incremental model, user requirement are prioritized and the highest priority requirements are included in early increments. Once the development of an increment is started, the requirements are frozen though the requirements for later increments can continue to evolve.

Advantages:

- Lower risk of overall project failure
- System functionality is available earlier and customer training can begin early
- Frequent release allow problems to be fixed quickly
- Additional features maybe added to polish the software developed

Disadvantages:

- Customer may not be satisfied with frequent change to system
- Difficult to map customer's requirements onto increments of the right size
- Problem may not be easily decomposable

3.1.5 Spiral Model

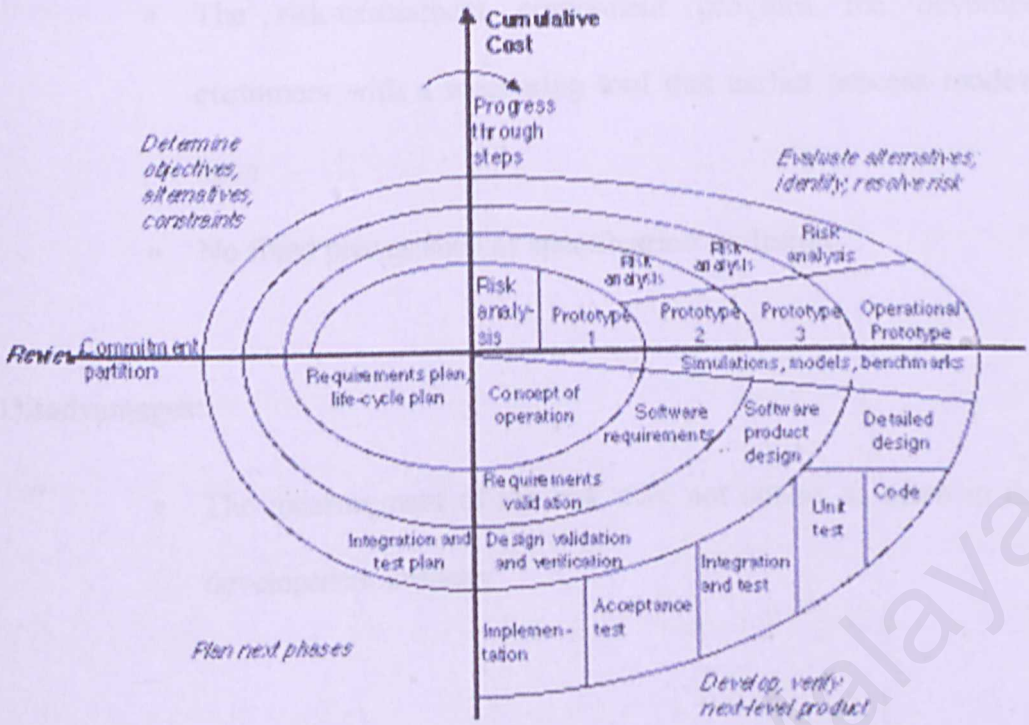


Figure 3-5: The Spiral Model

Resource from URL:

http://www2.umassd.edu/CISW3/coursepages/pages/CIS311/Lecturemat/process/lifecycles/lifecycles.html

Spiral model introduces a new component – risk-assessment and was designed to include the best feature from the waterfall and prototyping models. For Spiral model, an initial version of the system is developed, and then repetitively modify based on input received from customer evaluations. Moreover, the development of each version of the system is carefully designed using steps involved in the waterfall model. Risk-assessment that included in this Spiral model plays the role as a step in the development process as a means of evaluating each version of the system to determine whether or not development should continue.

Advantages:

- The risk-assessment component provides the developers and customers with a measuring tool that earlier process models do not have
- No fixed phases such as specification or design

Disadvantages:

- The measurement of the risk may not occurs as often in the system development industry

3.2 Justification of Methodology

Diagram below show the Waterfall Methodology with prototyping. This methodology is being chosen to develop the LTPC System.

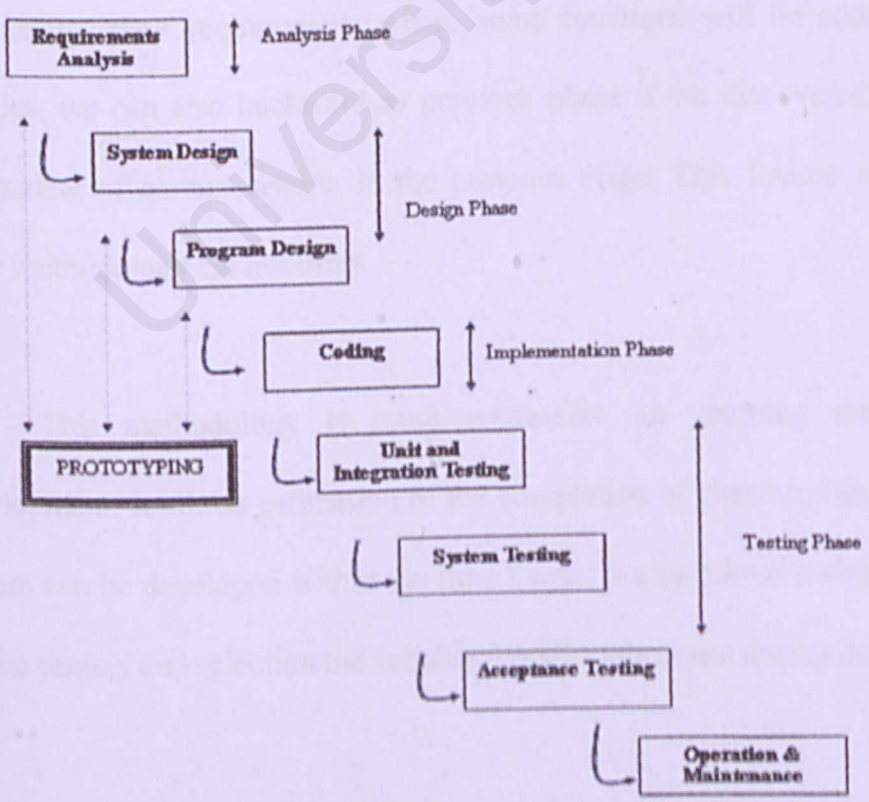


Figure 3-6: The Waterfall Model with Prototyping

The reasons for choosing Waterfall model with Prototyping as the development methodology are:

The waterfall model main strength is on its simplicity which the development methodology is simple, easier to understand and familiar to most developers.

In waterfall model, the following phase should not start until the previous phase has finished. I just need to emphasize at one phase first at one time and no need to worry about the next phase. Then I can take more attention focus and in the current phase and doing this phase well. After finished current phase, I can continue the next phase and so on until the system is completed.

By using the waterfall model, we can go back to previous phase although we are carry the next phase right now. This feature is important because sometime user will change their requirements where some functions will be added or removed. Besides, we can also backward to previous phase if we discovered some errors or incomplete of certain criteria in the previous stage. This feature is important and other methodology cannot offer.

This methodology is more emphasize on planning rather than rapid development. It allows estimation of the completion of phase (milestone) so that the system can be developed within the time frame. It also allows estimation of the cost for the project and selection the suitable CASE tools to use during development.

The Waterfall model should only be used when the requirements are well understood. This is because commitment must be made at an early phase in the process and this means that is difficult to respond to changing customer requirements. Therefore, I use the waterfall with prototyping to ensure that the requirements are feasible and practical (Requirements phase prototyping). Besides, design phase prototyping can help the developer access alternative design strategies and decide which is best for the project. With adding the prototyping in the Waterfall model, this methodology becomes more perfect and feasible to use to develop the LTPC System.

The waterfall model with prototyping is very consistent and good structured. If I used other complex methodology, it is difficult to me to explain to customer who is not familiar with the software development. So it is easier for me to use the Waterfall with prototyping which is simplicity.

3.3 Fact-Finding Techniques

Fact-Finding techniques are an essential skill for all system analysts. Fact finding (information gathering) is classical set of techniques used to collect information about system problems, opportunities, system requirements, and priorities.

The methods used in collecting data required for developing LTPC System are:

I. Internet surfing

II. *Books and references*

III. *Observation and informal interview*

IV. *Discussion with supervisor and friends*

I. *Internet Surfing*

The Internet is a platform where a lot of information can be acquired. With development of search engines such as Google, Excite, Yahoo and so on, relevant information sites can be viewed with only a click away provided users key in the related keywords for search. Through the Internet, idea and technique from the similar system can be collected.

II. *Books and References*

Book and references are used to get the information that needed to develop the system. Besides that, I also used the library services such as online E-Book to get references. There are a lot of references I can get from there. All references are very useful to help me in developing a system.

Furthermore, other source of reference is seniors' thesis. From seniors' thesis, I can get the clear idea about the report format and content for this thesis report. I can refer the thesis at FSKTM document room where got many thesis is collected in past few years.

III. *Observation and Informal Interview*

Observation is the fact–finding technique wherein the systems analysts either participate in or watches a person perform activities to learn more

about the system. The problems that always occur also can be discovered by observing the current learning system. We also can have informal interview to end user such as children, teachers and parents to get more end user requirements. Those end user requirements are very important to my building system later. Those requirements are the function or services that they need and want in building system.

IV. Discussion With Supervisor and Friends

A discussion with supervisor and friends has been practiced to get help and advices during the development of the project.

3.4 Conclusion on Tools and Technology

After all the technologies have been reviewed and analyzed, the most suitable and appropriate tools for developing the system are identified and selected.

3.4.1 Selected Standalone Application

Standalone application is system that runs locally on the users' computer. The whole application resides in the user's computer that does not connect to other computer. The data are not shared with other computers. Either developer will have to distribute the application or users will have to download it from a specific website. The hard disk, printers and other hardware connected to a stand-alone computer can only be utilized through the computer they are connected to and inaccessible to other

computer. Therefore, the distribution of the system is rather flexible. Systems can be written into compact discs, flash drives, zip drives etc.

The advantages of standalone application are:

- Resides totally on the users' computer
- Independent and works without any technical limitations
- Various ways of distribution are supported
- No server side programming required
- Information can be in multiple format

3.4.2 Selected Platform

After review those platform in current market, I selected Windows XP Professional as platform to develop my system.

Advantages of Windows XP Professional are:

- Have system restore feature enables users to restore a computer to a precious state without losing data.
- Increased application capabilities
- More stable and improved troubleshooting tools.

3.4.3 Selected Authoring Tools

Macromedia Flash MX

Macromedia Flash MX is selected for the system authoring tool as it is the professional visual editor. It supports 2D/3D graphics, animations and programming language that chosen for this project.

Advantages of Macromedia Flash MX are:

- Support many format of files (*.wmv, *.jpg, *.png……)
- Incorporate interactivity to permit input from viewers
- Design the navigation controls, long-form animations with synchronized sound, and even complete, sensory-rich interface.
- Contain all the information required to develop, design, and test interactive content

Adobe PhotoShop 7.0

Adobe Photoshop is a state-of-the-art tool with its comprehensive set of retouching, painting, drawing, and Web tools, Photoshop complete any image-editing task efficiently. And with features like the History palette and editable layer effects, which allow user to experiment freely without sacrificing efficiency.

Photoshop is a technical tool, for advance user, it can almost create any texture, any 2D image and can finely retouch on a photo. As Photoshop become more robust and rich features in every latest released, which makes it the best image editing software in the market.

Advantages of Adobe Photoshop 7.0 are:

- Provides new controls and security settings for superior images, precise output, and worry-free file sharing
- Support for Adobe Acrobat 5.0 security settings, allowing to add tighter security to Photoshop PDF files before sharing them with others
- Support for XML format which can embed metadata into a document so that can easily repurpose, archive, or automate files in a workflow
- Search and replace text, check spelling in multiple languages within the same file, and correct spelling on one text layer or across all text layers in the same document

Sonic Foundry Sound Forge

Sound Forge is an audio editor that includes a powerful set of audio processes, tools, and effects for recording and manipulating audio. This application is the professional's choice for audio editing, audio recording, effects processing, streaming-content creation, and more.

Sound Forge 7.0 continues to build on its decade-long legacy by adding features that make it more powerful than ever to enhance the work flow and productivity. These include DirectX plug-in effects automation; automated time-based recording and audio-threshold record triggering; enhanced spectrum-analysis tools; white-, pink-, and brown-noise generators; clipped peak detection and marking; Media Explorer; project-file creation and much more.

Advantages of Sound Forge are:

- Nondestructive editing
- Allow background rendering and processing
- Full support for audio files larger than 4GB

3D Studio Max

3D Studio Max is one of the most powerful, robust and rich features 3D modeler in the market, with the extensive range of modeling technique and user friendly GUI (Graphic User Interface) which makes 3D Studio Max 4 the tools for both beginner and expert. 3D Studio Max is a full 3D modeler, equip with vast number of plug in which makes an imagination comes more reality than ever. Basically, there is almost nothing than can be imagined and cannot be modeled by 3D Studio Max.

3D Studio Max is build with following features: Character animation, Advanced Skinning, Bones(Shaded Volumetric Bones System), Inverse Kinematics solvers, Flex, View port Manipulators, Parameter Wiring Game Development features, Customs Attributes, Polygon Modeling, Hierarchical Subdivision Surface Modeling, Advanced Bezier Modeling, Active Shade, and better Raytracing.

3.5 Chapter Summary

This chapter discuss about the methodology of the system development. Waterfall methodology with prototyping has been chosen as the framework to develop the system. Various techniques of information gathering such as internet surfing, books and references, observation and informal interview, and discussion with supervisor and friends have been practiced. This chapter also includes the conclusion on tools and technology

The next chapter will focus on the system requirement including functional requirement, non-functional requirement, and software and hardware requirement

Chapter 4 System Analysis

4.1 System Analysis

System analysis is the study of a business problem domain to recommend improvements and specify the business requirement for the solution [11]. During the analysis phase, information needs and performance criteria are defined by engaging in a variety of information-gathering activities, and developing alternative solutions.

4.1.1 Purpose

i. Acquire knowledge on how the current available learning system.

ii. Identifying major components to be included.

iii. Gain an overall understanding of system data flow and system work.

iv. Identifying software and hardware requirements needed to develop and reside in the system.

v. Create a system specification definition that describes both the functional and non-functional requirements.

4.2 Requirement Analysis

System Requirements define the system's services, constraints and goals are established by consultation with system users. Requirements can be categorized to functional requirements and non-functional requirements.

4.2.1 Functional Requirement

A functional requirement is a function or feature that must be included in an information system to satisfy the business need and be acceptable to the users [12]. Functional requirements usually are state what the services that the system should provide, how the system react to the input and how the system behave.

The LTPC System will be used by different end users those are children, teachers or parents. Different end users will be provided by different services or functions. The functional requirements are divided to modules as below:

4.2.1.1 Teacher/Parent Module

- As a learning package for the children.
- Users can view the subject that provided in this module.
- This module are provided subject such as Alphabet, Numbers, Shapes/Colors, Moral, Human Being's Body and Family Relationships.
- As a source for teacher / parent to teach the children.
- Children, teacher and parent can use this module.

4.2.1.1.1 Alphabet

- Display all 26 alphabets following with 3 examples for each alphabet.
- Children can recognize the examples for each alphabet which can come across in their daily routine.

4.2.1.1.2 Numbers

- Children can learn number 1-20 in this module.

4.2.1.1.3 Shapes/Colors

- Children can recognize 10 different of color such as black, white, red, yellow, orange, green, blue, purple, pink and brown.
- They also can learn and differentiate the shape from this module.

4.2.1.1.4 Moral

- Children can learn about good behavior.

4.2.1.1.5 Human Being's Body

- Children can learn general human body parts.

4.2.1.1.6 Family Relationships

- A family relationship diagram will be formed.

4.2.2 Non Functional Requirements

Non-functional requirements are defined as constraints under which the system must operate and the standards, which must be meet by the delivered system. The non-functional requirements for the LTPC System are:

a) **Usability**

The system must be considered an ease-to-use application where the users no need to have any training to use the system. The system interface design should be consistent, attractive and easily understood by the users.

b) **Respond Time**

The system must be has fast respond time where users will not be kept waiting for a long time for the system to respond. The respond time to retrieve the information such loading menu can be considered within a reasonable interval time. It means that all desirable information should be available to user at any point of time.

c) **Reliability**

A system is said to have reliability if it runs undisrupted for a very long period of time without failure and crashing. All possible errors and failures are taken into consideration through extensive testing.

d) **Accuracy and consistency**

The system should return the correct and complete set of information when users are request the data. The same set of data should be display if the same query is using to search.

e) **System design**

System design should be kept simple, attractive, cute and funny as possible. A good combination of colors, fonts and size of fonts, pictures,

links and layout is essential. Multimedia and 3D element should be incorporated.

f) **Manageability**

The modules within the system should be easy to manage. This will make the maintenance and enhancement works easily and not times consuming.

g) **Maintainability**

The system can be corrected should an error occurred. Furthermore, it could adapt to new demand and requirements or enhanced in the future.

h) **Expandability**

The system should be able to be extended to accommodate more functionality in the future.

4.3 Hardware and Software Requirements

Hardware and software requirement describe constraints on computers and peripheral equipment, their capacity and time available for use, and development support software. Hardware and software requirements need to be decided to determine the feasibility of performance requirements. Both of them are divided into developer side and user side requirements.

4.3.1 User Side Requirement

Hardware Requirement	Software Requirement
➢ Pentium 233 MHz and higher ➢ RAM 64MB and above (128MB is recommended) ➢ 16MB Graphic Card ➢ Standard input and output ➢ Others standard computer peripherals	➢ Windows 2000 (Windows XP is recommended)

4.3.2 Developer Side Requirements

Hardware Requirement	Software Requirement
➢ Pentium IV 1.6 Gigabyte ➢ RAM 128MB ➢ Hard disk 10 GB ➢ 32MB Graphic card ➢ Others standard computer peripherals	➢ Windows XP ➢ 3D Modeling tools ➢ Adobe Photoshop 7.0 ➢ Macromedia Flash MX ➢ Paint Shop Pro ➢ Sound Forge

4.4 Chapter Summary

Chapter Four presents the system analysis which about the functional requirement, non-functional requirement and hardware and software requirements. The functional requirements are divided into 2 modules. There are children module and teacher/parent module. Each module presents certain functions for the system. However, I am in charge of teacher/parent module. Whereas the non-functional requirement classified by usability, respond time, reliability, accuracy and consistency, system design, multi-user environment, manageability, maintainability and expandability. The run-time requirement for the server side and client side are specified at this chapter.

Chapter Five presents the system design of the project. The designs are including the system functionalities and user interface design.

Chapter 5 System Design

5.1 Introduction

System design is a process to convert the conceptual ideas from requirement specification in system analysis into more technical specification.

In system design phases, the system requirements will be transmitted into a representation of system. Initially, the representation depicts a holistic view of system; subsequently refinement reads to a design representation that is close to source code. In this system design phase, input, output, file and database were produced which include the designed of input forms, screen in order to gather input data, data dictionary, file specification and report design. The objectives of system design are to specify logical design elements which consists detailed design specifications that describe the features of information system. Beside that, it also specifies components and functions with adequate details to construct application software for purpose meet the user requirements.

Under this chapter, the system design will be discussed into the following categories:

i. System Functionality Design

ii. User Interface Design

5.2 System Functionality Design

System functionality design is based on the system requirements stated in chapter 3. It translates the system requirements into system functionality. This design is focuses on the system structure design and data flow diagrams.

5.2.1 System Structure Chart

The system structure is used to depict high-level abstraction of the LTPC System. The use of structure chart is to describe the interaction between independent. Major functions from the initial component part of the structure chart, which can broken into detailed sub-component. LTPC System consists of two subsystem or sections. Each of the two components is further divided into many modules.

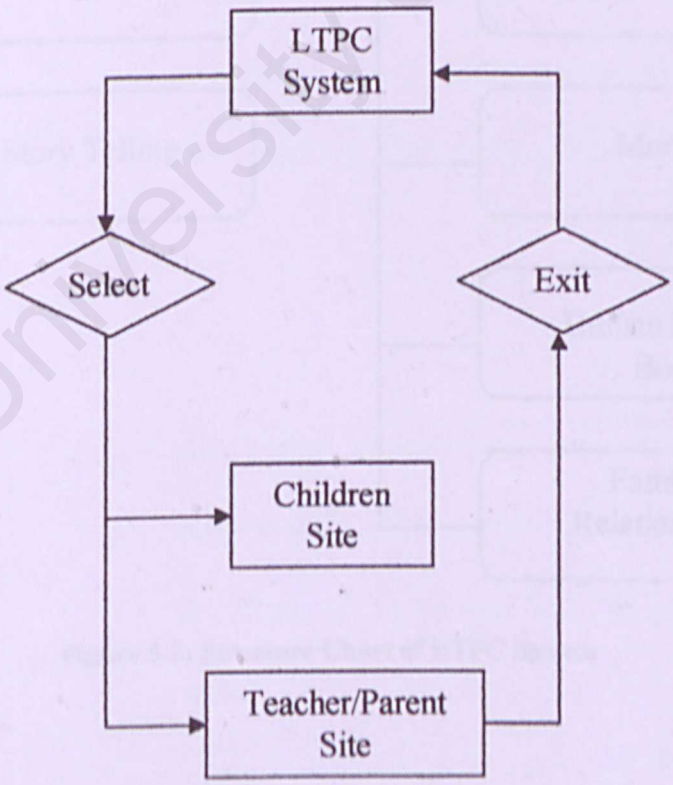


Figure 5-1: Main Module for LTPC System

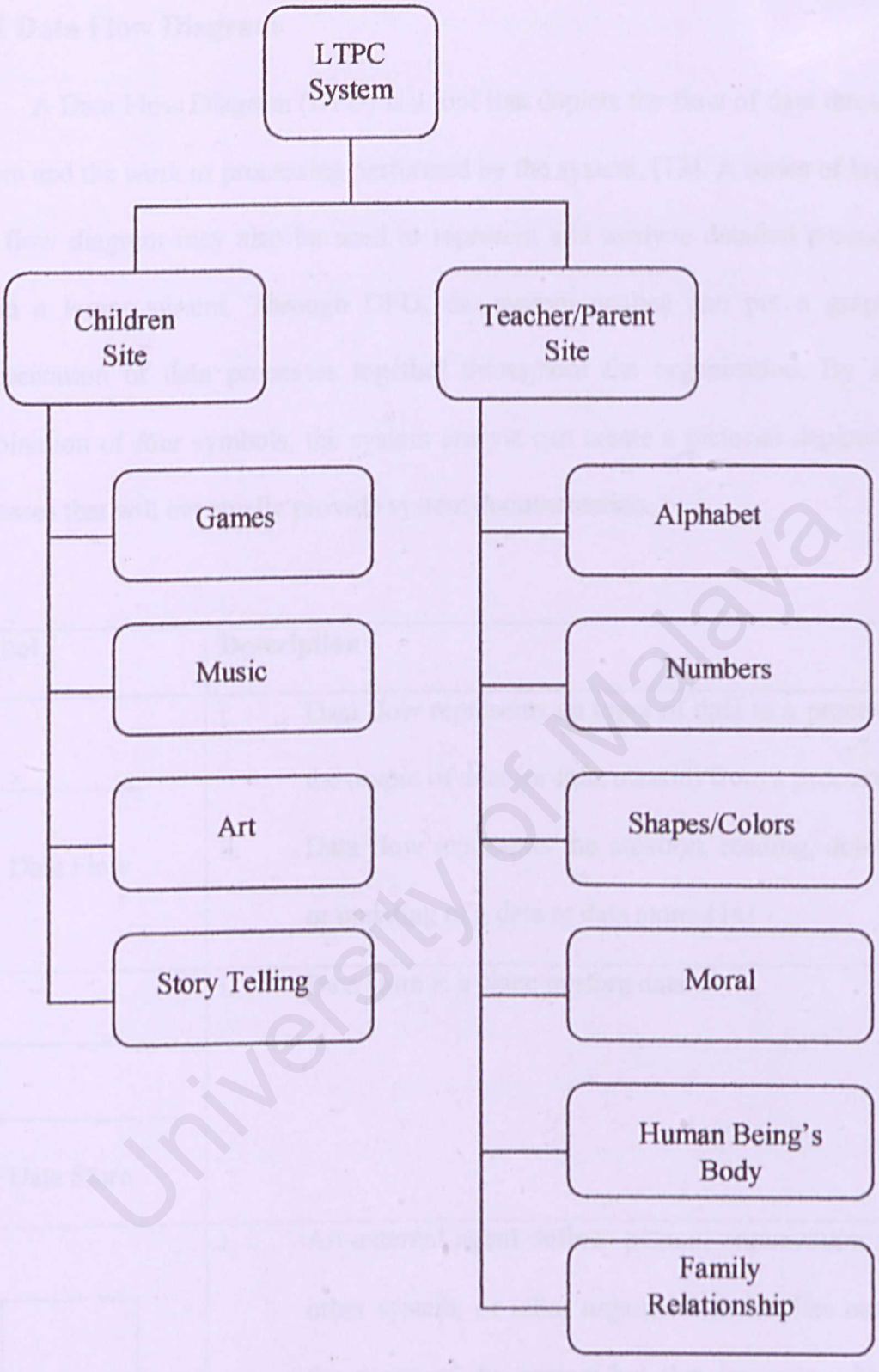
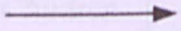
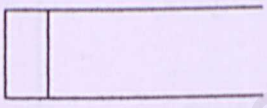
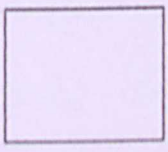


Figure 5-2: Structure Chart of LTPC System

5.2.2 Data Flow Diagram

A Data Flow Diagram (DFD) is a tool that depicts the flow of data through a system and the work or processing performed by the system. [13]. A series of layered data flow diagram may also be used to represent and analyze detailed procedures within a larger system. Through DFD, the system analyst can put a graphical representation of data processes together throughout the organization. By using combination of four symbols, the system analyst can create a pictorial depiction of processes that will eventually provide system documentation.

Symbol	Description
 Data Flow	i. Data flow represents an input of data to a process or the output of data (or information) from a process. ii. Data flow represents the creation, reading, deletion, or updating of a data in data store. [14]
 Data Store	i. Data store is a place to store data.
 External Agent	i. An external agent defines person, organization unit, other system, or other organization that lies outside the scope of the project but that interacts with the system. ii. It provides the net inputs into system and receives net output from a system. [15]

Process	i. Transform the input data to output data ii. Comprise 2 sections: a) top section contain identifier information b) center section contain description of the process

Table 5-1: Four Basic Symbols Used in Data Flow Diagram

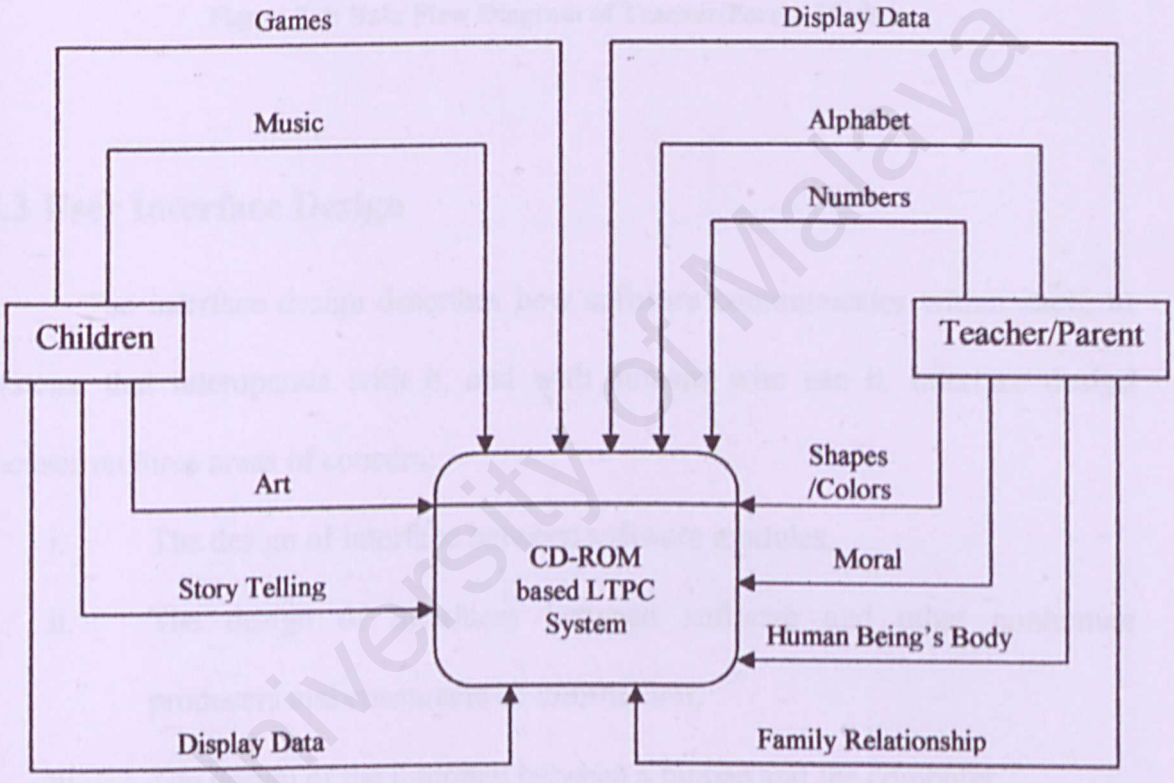


Figure 5-3: Context Data Flow Diagram of LTPC System

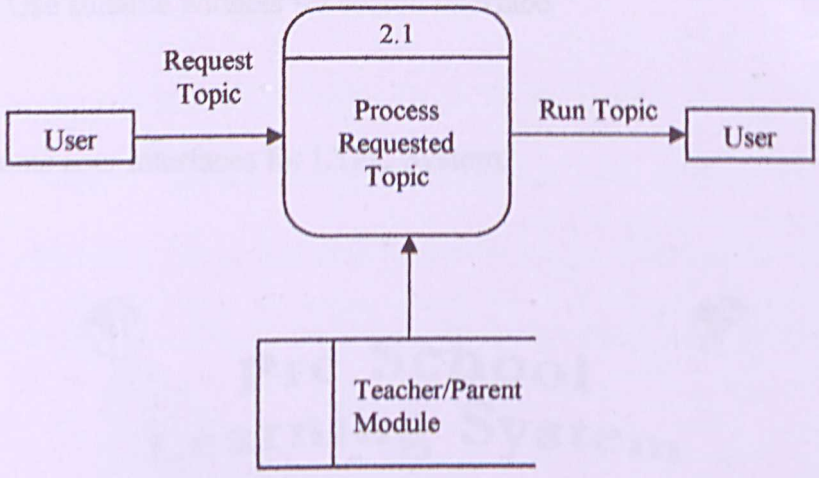


Figure 5-4: Data Flow Diagram of Teacher/Parent Module

5.3 User Interface Design

The interface design describes how software communicates within itself, to systems that interoperate with it, and with humans who use it. Interface design focuses on three areas of concern:

i. The design of interface between software modules.

ii. The design of interfaces between software and other nonhuman producers and consumers of information;

iii. The design of the interface between a human and the computer.

The following are some of the consideration taken while designing the user interface of system:

i. use a consistent format for menu search and data display

ii. Offers feedback such as error message will prompt to remind user when user input something wrongly.

iii. Reduced the command that must be memorized in order to carry out any operations.

iv. Use suitable widgets for search interface.

Below are some user interfaces for LTPC System:

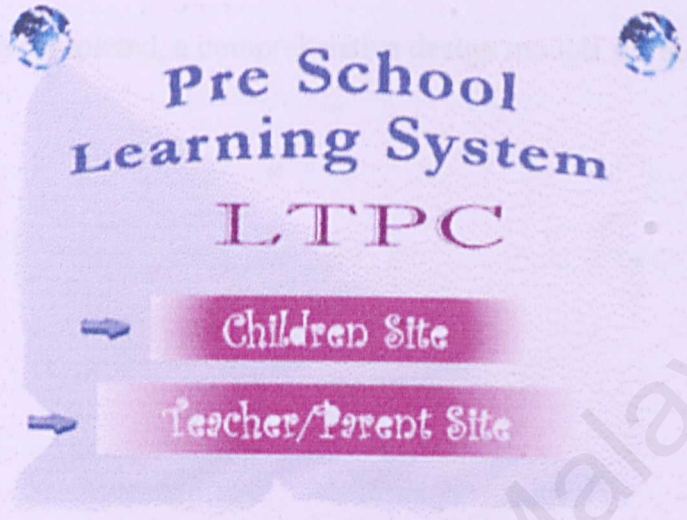


Figure 5-5: Main Page Interface

Figure 5-6: Teacher/Parent Page Interface

5.4 Chapter Summary

The design phase is concerned with detailing the physical implementation of the proposed system. System design encompasses two distinct but interrelated activities: functionality design and user interface design. When each of those design activities has been completed, a comprehensive design models for the system.

Chapter 6 System Implementation

During this phase, the design model of LTPC System is transformed into workable product. Therefore, system implementation involved the translation of the software representation produces by the design into a computer understandable form. It involves coding of the program by using the appropriate language and coding approach, testing of the system to ensure every function work properly and debugging the code, which will identify and correct bug within program.

6.1 Development Environment

The initial stage of system implementation involves setting up the development environment. Development environment is very important to the development of a system as suitable hardware and software will determine the success of the project.

6.1.1 Hardware Configuration

The following hardware specifications have been used to develop the system:

- Intel Pentium IV 1.4 Ghz
- 256MB SD RAM
- 20 GB Hard Disk
- 15" color monitor capable of 800 x 600 resolution
- Standard Input and Output
- Others standard computer peripherals

6.1.2 Software Configuration

There are a lot of software tools, which are used in designing program and writing report. Below is a listing of software used throughout the development process as pertaining to the specific usage:

Software	Usage	Description
Microsoft Windows XP	System Development	Operating System
Macromedia Flash MX	System Development	Authoring Tool
Adobe Photoshop 7.0	System Development	2D Authoring Tools
Swift 3D	Model Development	Modeling and Animation
3d Studio Max 6	Model Development	Modeling
Sonic Foundry Sound Forge 6.0	Sound Development	Sound Authoring Tools
Microsoft Word	System Development	Documentation

Table 6-1: Software Used

6.2 Platform Development

Services and tools installations are the first step in order to start the development. Platform development includes setting up the operating system.

6.2.1 Setting up Operating System

Microsoft Windows XP is used as the operating system for this project. Before the installation begins, the hard disk needs to be formatted. This is to ensure a more stable and secure environment. Moreover, it can also prevent the environment being affected by previous settings or configurations. Windows XP's installation is

very easy as it provides many descriptive interface guides. User just needs to follow the steps by steps instruction appear on the installation's menu interface.

6.3 Program Development

During program development, program is fully written and user interface is being developed.

6.3.1 Program Development Process

Basically, the LTPC System is following a program development process that consists of 5 steps:

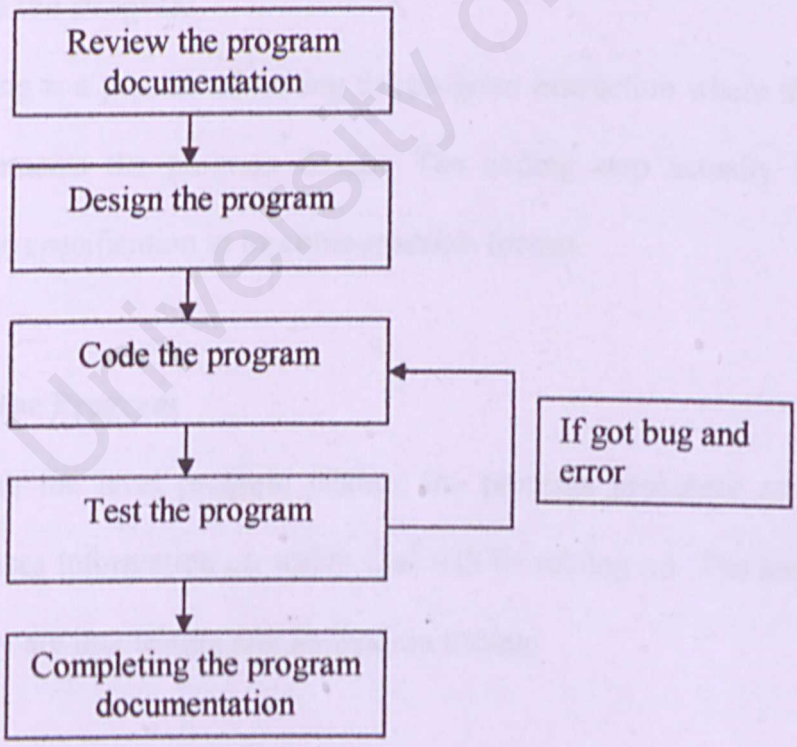


Figure 6-1: Program Development Process

i. **Review the Program Documentation**

The program documentation that was prepared during the early phases needs to be reviewed. This documentation can give the designer better understanding what the user requirement and specification of the system which is need to develop.

ii. **Design the Program**

After review the program documentation, the second level of program design needs to be completed during the system development where the designer decides exactly what the program can accomplish. This is the process of what it must do by developing a logical solution to the coding problem.

iii. **Code the Program**

Coding is a process of writing the program instruction where this instruction implements the program design. The coding step actually translates the design specification to machine-readable format.

iv. **Test the Program**

During the level program testing, the program processes actual data and produces information on which user will be relying on. The testing involved mostly are unit testing and integration testing.

v. **Completing the Program Documentation**

Completing the program is essential for the successful operation and maintenance of the system. This documentation includes the system's user manual that may be needed by most of the customer.

6.3.2 System Development

The main system development divided to 3 distinct parts. There are:

i. **User Interface Development**

The user interface development is a logical designing part of the system; it is the most important part which consumes the most time and effort. This part will achieve all the objective of the system. This part will also act as main editor where other part of development will be edited and combined here. Therefore any unsatisfactory part of other development will rework in order to suite the user interface development.

ii. **Graphic Development**

Graphic development is to produce the 2D graphics and 3D graphics in the system. For 2D graphics, the product developed including buttons, backgrounds and other supplementary graphics. While for the 3D graphics, the product developed including shapes models, text title models and other 3D image models. The main tools of the product for 2D graphics and 3D graphics are Adobe Photoshop 7.0 and Swift 3D.

iii. Sound Development

Sound development is to produce appropriate medium for sound effect. There are some recorded sounds (which modified in Sonic Foundry Sound Forge) will be included in the system.

Each development is an independent development and consistently produces a final product which will merge together in the system development.

6.4 Chapter Summary

In this system implementation phase, nearly all the design phases that have been presented and directed toward a final objective that needs to translate representation of system into a form that can be understood by computer.

Chapter Seven presents the various type of system testing that includes the unit testing, integration testing and the system testing.

Chapter 7 System Testing

Testing is critical in uncovering logical error and to test the system reliability. The main objective of testing is to uncover different types of errors that exist while executing the system. System testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. However, testing can only show that software defects are present.

In developing a system, testing usually involves several stages. An example of testing process is shown as below:

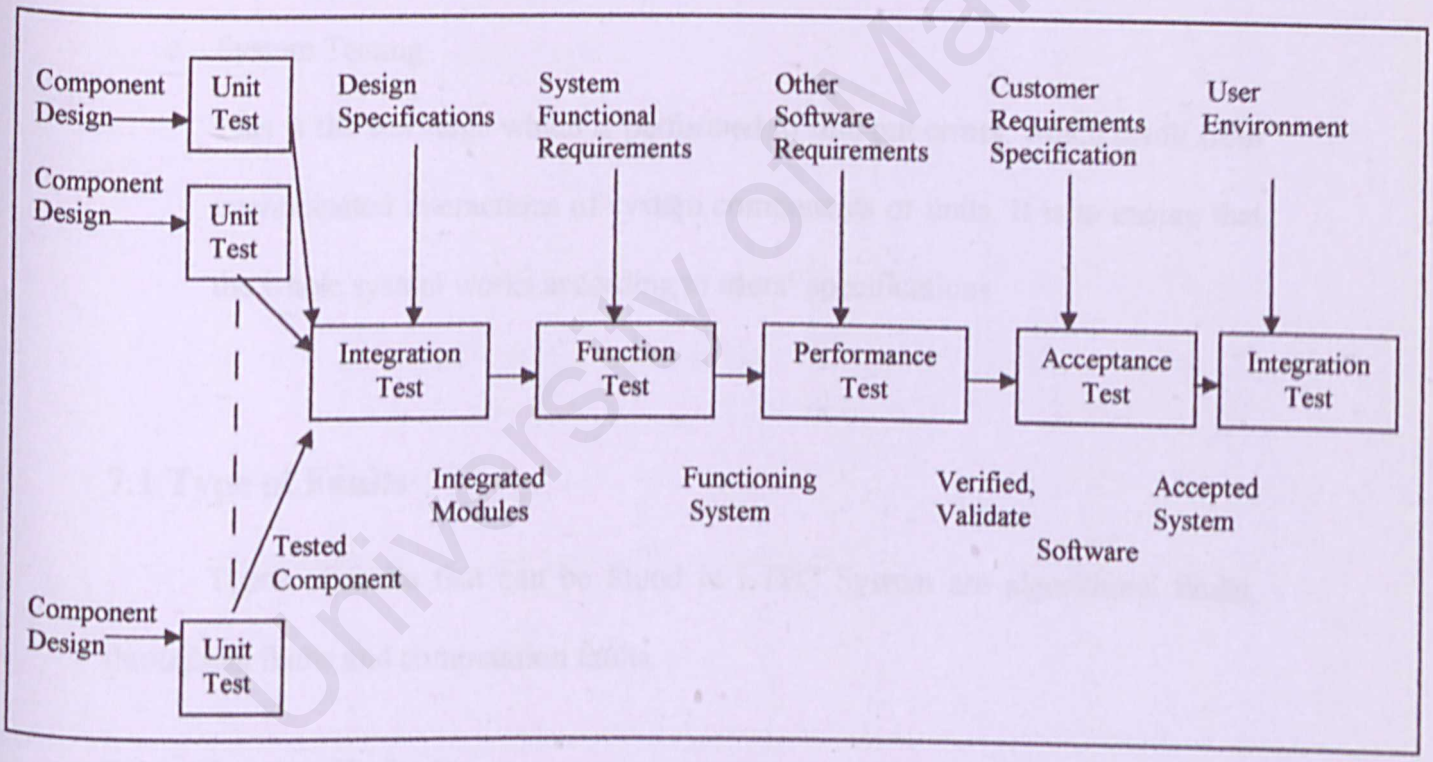


Figure 7-1: Testing process

Generally, there were 3 stages involve altogether and were listed down as below:

a. Unit Testing

This is the first stage of testing where each program component is tested on its own and is isolated from the other components in the system. It verifies

that the component functions work properly with the types of input and output expected from studying the component's design. After each component has been tested, the interaction between these components must be tested again to ensure that the components can be integrated.

b. Integration Testing

This stage ensures that the interfaces among the components are defined and handled properly. It is the process of verifying that the system modules work together as described in the system and program design specifications

c. System Testing

This is the last stage which is performed to find out errors, which result from unanticipated interactions of system components or units. It is to ensure that the whole system works according to users' specifications

7.1 Type of Faults

Types of faults that can be found in LTPC System are algorithmic faults, throughput faults and computation faults.

7.1.1 Algorithmic faults

Algorithmic faults use to happen when a component's algorithm or logic fails to produce the expected output for a given input. These kind of fault usually occurs on wrong proceeding of steps in algorithm. Examples of algorithmic faults in LTPC System are:

- Using wrong symbols behavior

- Forgetting to test for a particular condition.

7.1.2 Throughput/Performance faults

Throughput faults or performance faults use to happen when the component does not produce an expected speed. When discover this fault in LTPC System, the fault is being carefully observed and monitor continuously to ensure performance meet requirement. In most cases, the fault occurs during massive usage of graphic on a particular application.

7.2 Testing Techniques Used

7.2.1 Ad Hoc Testing

Ad hoc testing is an attempt to break the program or make it fail with trying whatever comes to mind. Normally, many errors will be found during the testing.

7.2.2 White Box Testing

White Box testing is the type of testing that deals directly with the stricture of the code within a module.

7.2.3 Black Box Testing

This type of testing involves testing functions of a module without knowing the logic structure of the code. It focuses on the most important aspects of a module in the term of how well the module meets its specification.

7.2.4 Try and Error

This approach is similar to 'ad hoc testing' where tester tries any type of test cases which come across his/her mind or pre-planned test cases. This approach is usually used when most of the logical solutions seem unsuccessful.

7.3 Testing Strategies

There are a few testing strategies such as unit, integration and system testing is done in order to test the reliability of LTPC System.

7.3.1 Unit Testing

Unit testing is done to uncover errors in each module. The primary goal of unit testing is to confirm that the unit is correctly coded and that is carries out the function as it is supposing to perform. Each unit is tested independently in order to assure their accuracy. For LTPC System, each module may contain of functions. The functions are individually tested before the entire module is tested. In the development of LTPC System, unit testing was conducted after development of each of the component and it is a continuous process throughout the coding phase.

LTPC System Unit Testing

Some of the unit testing being done on LTPC System as below:

- Test whether the user can successfully logged into the system.
- The display is tested after a single program file has been developed to ensure that all the display is correct and expected. These interfaces contain lots of buttons

and hyperlinks. Testing for those buttons and links is needed so that the program performs correct action or link to the correct location.

LTPC System Debugging Strategies

Debugging is actually of finding and fixing the errors. There are several debugging strategies that applied in LTPC System such as:

- Built-in Error Detection

  Error will be discovered if a program is not performing well. Flash MX has built-in error detection where an error message will be debugged. With this features, the debugging work becomes much easier and faster.

- Reviewing the Algorithm Used

  Reviewing algorithm for the correctness and efficiency will help to discover logic error. Usage of different algorithms will sometime increase the efficiency of the program.

- Display the Passing Value On Screen

  By displaying the passing value on screen, it helps to ensure that the correct value has been passed to the next program for processing.

- Check Success Status

  The success status is checked to determine whether to continue the process or exit from the program and display error message whenever there is failure in the previous process.

7.3.2 Integration Testing

The purpose of the integration testing is to know whether the entire software is able to work as one program. It will also verify that each module will be able to function together. Integration testing concentrates on module interaction and the detection of interface errors. The design specification is referred for the purpose of verification and helps to test the software according to the dependencies present in particular module that being tested. For LTPC System integration testing, the system is viewed as a hierarchy of components, where each component belongs to a layer of design. The approach applied in testing the LTPC System is referred as Top-Down Integration where integration will start at the highest level of main program or module or sub modules are gradually added until the bottom is reached.

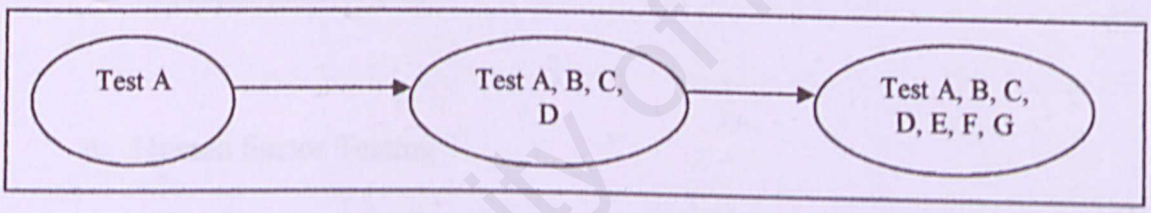


Figure 7-2: Top-Down Testing

7.3.3 System Testing

A system testing is a series of different test designed to fully exercise the system to uncover its limitation and to measure its capabilities. The objective is to test an integrated system and verify that it meets the specified requirements. Several steps were taken in testing LTPC System such as function testing and performance testing. There are several steps in testing a system such as function testing, performance testing and acceptance testing. I performance my system to some peer friends who are act as end user parent and include their children give them to try and testing my system.

Performance Testing

Performance testing aims at testing the run-time performance. Response time of the event triggered was checked to verify the performance of the system.

a. Stress Testing

The main purpose is to determine whether the system can handle, as it should, large and varies workload at one time. It subject system to high loads over a short period of time.

b. Security Testing

The objective is to verify the protection mechanism such as dealing with improper penetration.

c. Human Factor Testing

In this testing, interface is being evaluated by many user to get the best interaction effects. It concentrates at the appearance and the interaction of the system. All aspect that may be related to ease of use, such as display screen, will be examined.

Acceptance Testing (End User Testing)

There are two type of end-user for the LTPC System which is pre school children and teachers/parents. Before delivery the system, I need to find end user to test and evaluate my system and I can get comment and suggestion from them to improve my system quality and usability. I prepare some evaluation form to get comment and suggestion form end user. From their suggestion and comment, I can

do some changing if possible or as my system future enhancement. I have invited some parents and children to test my system. Beside that, I also invited some students from faculty to fill evaluation form and give comment and suggestion to my system. Due to time constraint, I consider students as parents and ask them to fill the evaluation form (view from parent perceptions). Below are some comments from the end user through analysis from the survey.

Evaluation from some teachers/parents after testing

1. I was conducting my testing and get feedback from the parents. Firstly, I explained to the parents about what the system that I was designed. I also do demonstration for every function and explained the usability of the functions. There are some feedbacks from them during conversation. After demonstration, I let the parents to try the system functions. Lastly, they fill the form to evaluate my system.

2. Below is the statistic of the survey:

Evaluation Field	**Agree**	**Moderate**	**Disagree**
Overall System			
1. Interface attractive?	6	1	0
2. Respond time (fast)?	5	2	0
3. Easy to use?	6	1	0
Syllabus of System Usability			
A = Alphabet	5	2	0
B = Number	6	1	0

C = Shapes / Colors	5	2	0
D = Moral	4	3	0
E = Human Being's Body	6	1	0
F = Family Relationships	5	2	0

(7 teachers/parents)

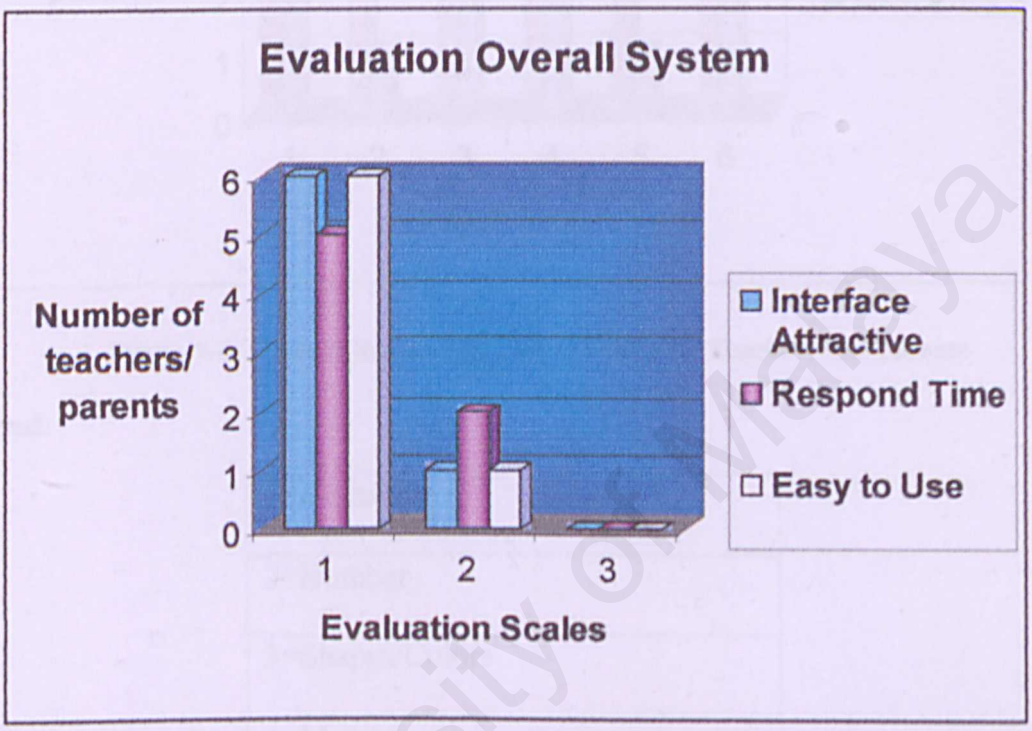


Figure 7-3: Mode Overall System Performance by Teachers and Parents

Legend:

1 = Good	2 = Moderate	3 = Poor

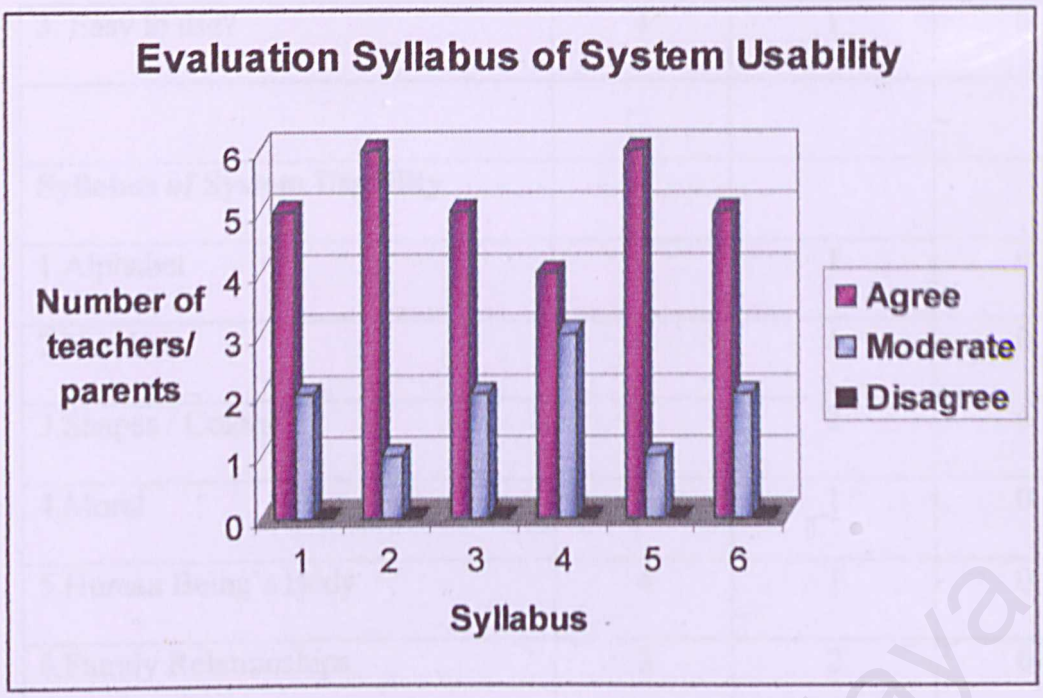


Figure 7-4: Mode Syllabus of System Usability by Teachers and Parents

Legend:

1=Alphabet
2=Number
3=Shapes/Colors
4=Moral
5=Human Being's Body
6=Family Relationships

Evaluation from End User (Student act parent)

1. Below is the statistic of the survey:

Evaluation Field	**Agree**	**Moderate**	**Disagree**
Overall System			
1. Interface attractive?	4	1	0
2. Respond time (fast)?	3	2	0

3. Easy to use?	4	1	0
Syllabus of System Usability			
1.Alphabet	4	1	0
2.Number	4	1	0
3.Shapes / Colors	3	2	0
4.Moral	4	1	0
5.Human Being's Body	4	1	0
6.Family Relationships	3	2	0

(5 student as parents)

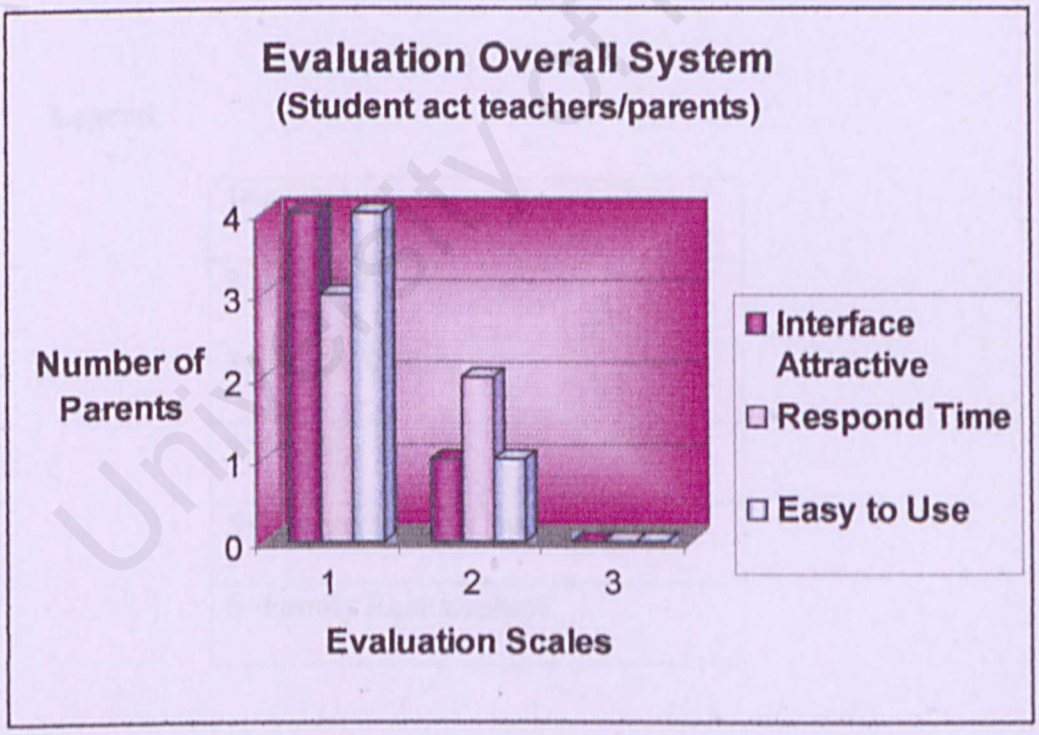


Figure 7-5: Mode Overall System Performance by Parents

Legend:

1 = Good	2 = Moderate	3 = Poor

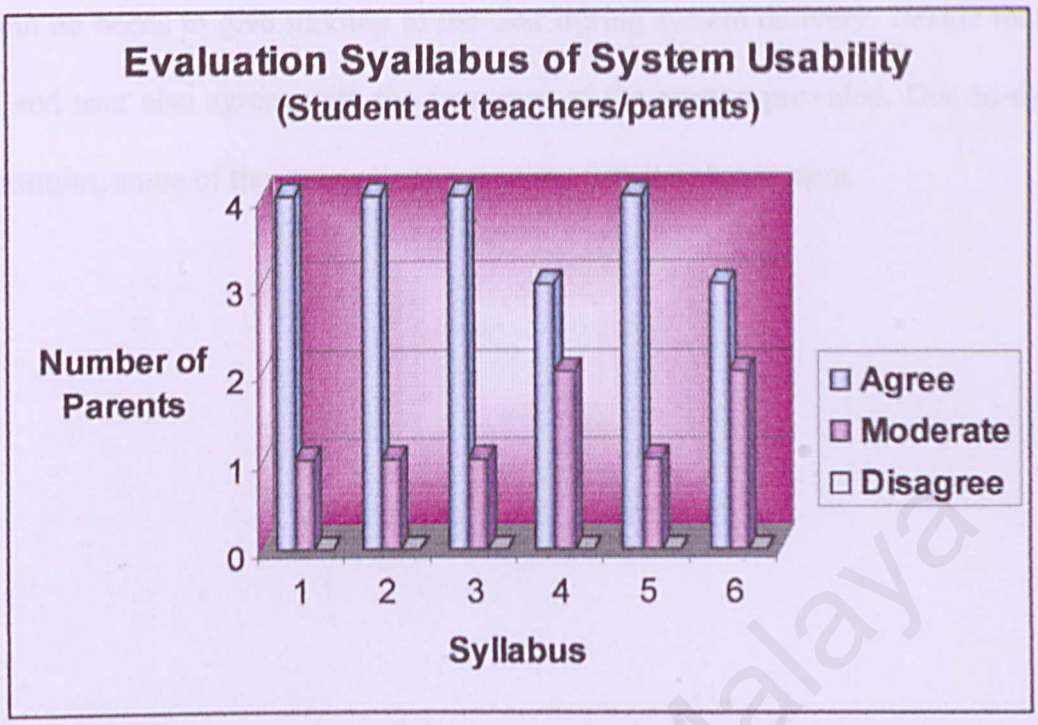


Figure 7-6: Mode Syllabus of System Usability by Parents

Legend:

1=Alphabet
2=Number
3=Shapes/Colors
4=Moral
5=Human Being's Body
6=Family Relationships

Conclusion for End User Testing

Through the statistic above, overall system non-functional requirement achieve the goals where the system interface is attractive, fast respond time and easy to use it. Most of the teachers/parents do not have computer knowledge at all but

they still conclude that the system is easy to use. This is a high achievement because the system no needs to give training to the user during system delivery. Beside that, most of end user also agrees with the functions of the system provided. Due to the time constraint, some of the suggestions are as my future enhancement.

7.4 Chapter Summary

Testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. Unit integration and system testing has been carried out for LTPC System. At the end of the testing phase, the system should be able to perform the tasks required and free of errors.

Chapter eight present the system evaluation which reveals the problem encountered and solution, system strength and system constraints, future enhancements, knowledge and experience gained.

Chapter 8 System Evaluation

Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end user. System evaluation was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all the phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

8.1 Problem Encountered and Solution

The following are the major problems encountered from the beginning of the project through the end of the system development process.

8.1.1 Scope Is Not Properly Defined

In the initial stage of development, several problems were encountered in specifying the scope of the system. The scope must be clearly defined before the system can start. The solutions to solve the problems are through interviewing the potential users, checking the current available similar site and also having discussion with supervisor.

8.1.2 Problems in Tools Selection

Choosing the right tools is important because the appropriate tools would help to develop the system in a more efficient way. To solve this problem, I have

discussed with course mate who develop similar system and also having some research and review on various tools.

8.1.3 Difficulties in Designing User Interface

I was lack of knowledge and experience of the real system flow and layout of standard user interface. Therefore, it is difficult in designing the most appropriate logic and user interface. By referring to many system interface, it helps to design the user interface in a more presentable and attractive style.

8.1.4 Limited Knowledge about Pre School

Limited knowledge about pre school causes difficulties in developing the system. Problem solved by searching information via internet and asked some opinion from my friends who are working at kindergarten as a teacher before. Through those my friends, I get many useful information about pre school.

8.1.5 Lack of Hardware and Software Configuration

The hardware and software needed to develop the LTPC System need to be configured to meet its development requirements. Beside that help files and references from the Internet also being used to solve the problem.

8.1.6 Lack of Flash MX Resources in University of Malaya

Flash MX is a well known and popular in development but the library of University Malaya does not have much resources for Flash MX references books.

There are only have Flash 5 reference books in library only but I required Flash MX reference book. Therefore, I turned on to electronic reference. Electronic resources could be obtained through the Internet and it is more convenient and up to date.

8.2 System Strengths

The system strengths are described as follow:

8.2.1 Standard Interface

LTPC System provides a standard interface appearance through the whole system. Besides, it has friendly GUI where all type of button is well defined. This is to ensure that the user can easily use the system without any briefing or with minimal training.

8.2.2 Ease of Getting Information

The system provides 6 syllabuses such as alphabet, numbers, shapes/colors, moral education, human being's body and family relationships. User can get all these information by just click on the system.

8.2.3 System Transparency

System transparency refers to the condition where the users do not need to know about the structure. For instance, users do not need to know how to create a page. All they need to do is to click on the button that provided tot get information.

8.2.4 Simpler Than Manual System

LTPC system is simpler to use compare to the manual system. LTPC system provides a paperless environment.

8.2.5 Viewing Scene

LTPC system provides live viewing scene for children, teacher and parent. The teachers can teach by using this system in anywhere, not only just in the class or parents teaching their children at home.

8.3 System Constraints

The system constraints are described as below:

8.3.1 No Other Language Support

The system will only use English as single communication language as English is the international language. Other languages are not included in the system.

8.3.2 Limited Syllabus

The information for improving children education was limited. Just 6 syllabuses include in the system only.

8.4 Future Enhancement

Due to the limitation of this system, there are a few suggestions that may be useful to future enhancement of the LTPC System. The suggestions are as below:

8.4.1 Provide Changeable Version

As the system is aim at Malaysian Citizens, therefore besides English, providing another version of the national language – Bahasa Malaysia version. The user can choose either in Malay version or English version.

8.4.2 Improving the Viewing Scene

Viewing scene can be improved in its quality. Beside that, add more animation into the system so that it can be more attractive.

8.5 Knowledge and Experience Gained

By developing the LTPC system, personally I feel that I have learned a lot of things, which I have never, knew or realized before this. Some of the knowledge and experience gained.

Besides knowledge on technical aspects such as 3D modeling, graphic authoring and sound composition, there are also other valuable experiences gained from working on this project such as:

i. Being exposed to a system development environment

ii. Learn how to manage a project as in time and resource

iii. Experience on how to integrate and full utilize various technologies into developing system

iv. Learn to work independently

v. Cultivated skills in writing documentations and reports

vi. Boost self-confidence, self-esteem and good communication skill

8.6 Reviews on Goals

There should be certain expectation and objective achieved at the final stage of the project.

8.6.1 Expectation Achieved

The system had fulfilled the expectation stated at the early stage of the project. All the basic foundation of the system was being designed and implemented. Moreover, the end product met the criteria such as ease to use, reliability, manageability, expandability and usability.

8.6.2 Objective Achieved

The system created had fulfilled all the requirements stated in the early chapter, therefore, the objectives to establish the application had been achieved.

8.7 Chapter Summary

As a conclusion, this project was succeeded in achieving the objectives of developing multimedia learning tools for pre school children - LTPC System. It also projected the main idea of general office environment as to promote a paperless environment with the routing of information through the workflow application.

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Appendix

System Testing Evaluation Survey (Student)

1. Is the system interface attractive?

   ○ Attractive ○ Moderate ○ Poor

2. Is the system ease to use?

   ○ Easy ○ Moderate ○ Hard

3. How the system respond time?

   ○ Fast ○ Moderate ○ Slow

4. Please evaluate the syllabus of the system below(please tick for each section):
   1. Agree 2. Moderate 3. Not Agree

   i. **Syllabus: Alphabet,** which allow children learning all of 26 alphabets.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

   Additional Comment:

   _____

   ii. **Syllabus: Number,** which allow children learning number from 1-20.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

   Additional Comment:

   _____

   iii. **Syllabus: Shapes/Colors,** which allow children to learn differential of the various shapes and colors.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

   Additional Comment:

   _____

iv. **Syllabus: Moral,** which allow children introduce the moral education.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

Additional Comment:

_____

v. **Syllabus: Human Being's Body,** which allow children to know about the human body parts.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

Additional Comment:

_____

vi. **Syllabus: Family Relationships,** which allow children knowing more detail about the different family relationships diagram.

a. Attractive interface	1	2	3
b. Respond time	1	2	3
c. Usability	1	2	3

Additional Comment:

_____

Name:

_____

Matric Number: _____

Date: _____

Thank you for your cooperation!

User Manual

Table of Contents

List of Figures

Chapter 1 Introduction

LTPC System is a standalone system that is used by the pre school children, teacher and parent. The system provided a learning environment for the children. The LTPC system also can be a learning tool for the teacher and parent. The system provided some syllabuses for pre school children learn at it such as alphabet, numbers, colors and so on. They can also use the system to enjoy because the system provided game corner to the children. Beside that, LTPC system also allows children do some art work in it. Music corner and story telling corner can be found in the system also, this let the children feel relax besides learning.

1.1 About This Manual

This user manual will guide users through all the function available in the system. This manual includes the following part such as:

- System Overview
- Hardware and Software Requirement
- Teacher/Parent Module

Chapter 2 Hardware & Software Requirements

2.1 Client Side Requirements

2.1.1 Hardware Requirements

The hardware requirements to execute the system are listed below:

a) PC with a Pentium (Pentium 233MHz or higher)

b) At least 128 MB of RAM(256 MB is recommended)

c) At least 650 MB (2 GB is recommended)

d) VGA or other compatible monitor display

e) Others standard computer peripherals

Chapter 3 Getting Started

3.1 Start up LTPC System

1. Start Setup.exe
2. Go through the Installation procedure
3. Run the CD
4. Click on the main.exe to start the system

Chapter 4 Teacher/Parent Module

This module contents the syllabus of the learning corner, which are:

1. Alphabet
2. Numbers
3. Shapes/Colors
4. Moral Education
5. Human Being's Body
6. Family Relationships

4.1 Main Page

Figure 4-1: Main Page

Getting started:

1. The **Main Page** consists of 6 buttons which will link to sub modules which content the syllabuses of the system.

2. The navigation of the buttons are as below:

   - [Alphabet]

     Allow the user (children) learning alphabet or as a learning tool for the user (teacher or parent).

   - [Numbers]

     Allow user (children) learning number 1-20 or as a learning method for the user (teacher or parent).

   - [Shapes/Colors]

     Introduce the various shapes and color to the user (children).

   - [Model]

     Provided 10 examples of moral education to the user.

   - [Human Being's Body]

     Show the human body parts to the user (children) and as a learning tool for the user (teacher and parent).

   - [Family Relationships]

     Provided example of 2 generation and 3 generation relationship to the user.

Chapter 5 Directional of Sub Modules

5.1 Alphabet module

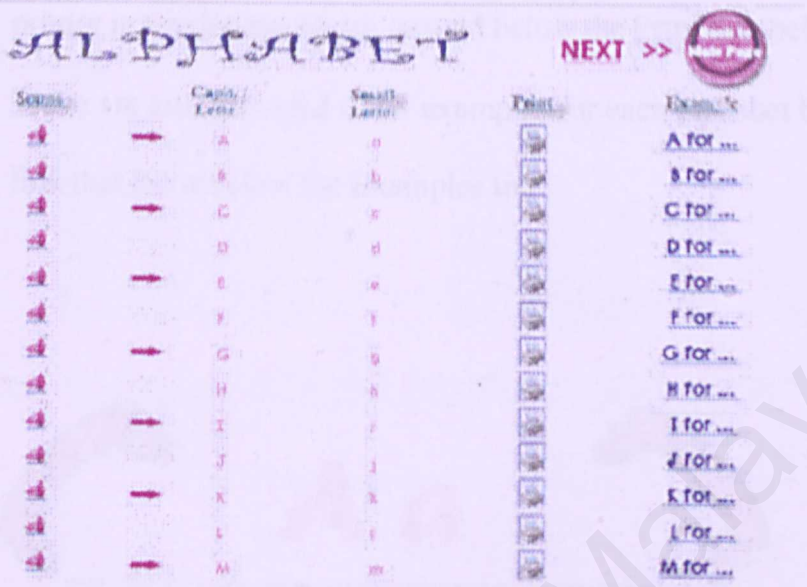

Figure 5-1: Alphabet page for A to M

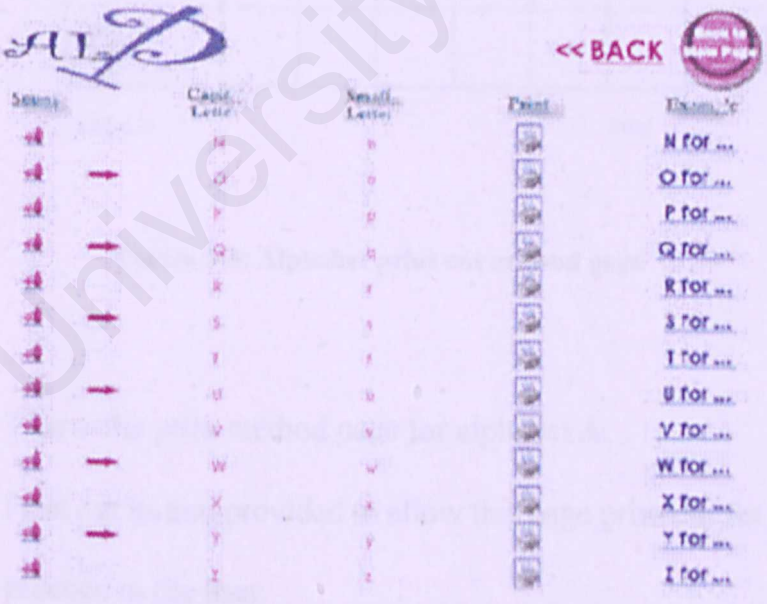

Figure 5-2: Alphabet page for N to Z

- This page just show the entire 26 alphabet which start from alphabet A to Z.

- The page provided the alphabet sound by just clicking on the speaker image follow the alphabet that you choose.
- Printing method also can be found in this page by just click on the printer image button which located below the Print title below.
- There are also provided a few examples for each alphabet by click the link that show below the Examples title.

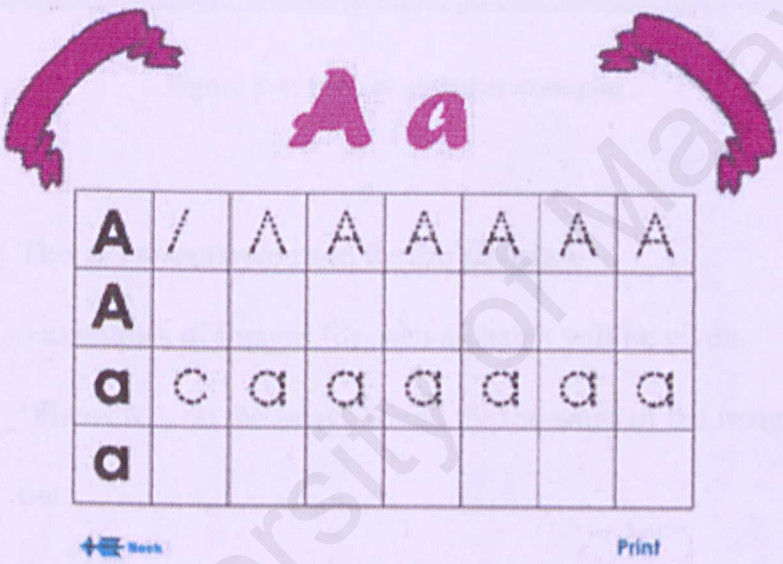

Figure 5-3: Alphabet print out method page

- This is the print method page for alphabet A.
- Print out button provided to allow this page print out for writing practice to the user.
- This system provided all 26 alphabet print out method.

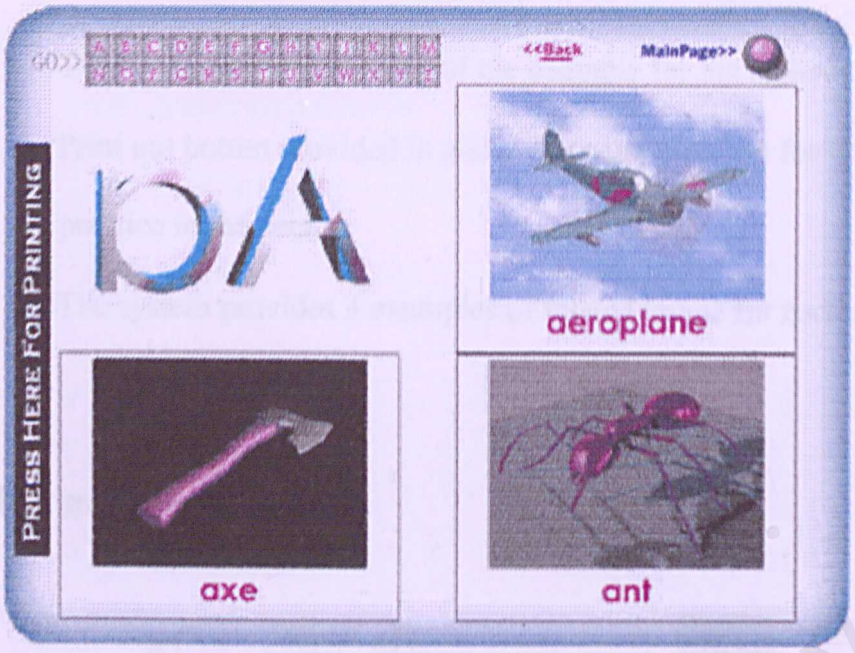

Figure 5-4: Page of alphabet examples

- This is the example page for the alphabet.
- 3 examples of images for each alphabet will be given.
- When click on the image sound for the word of the image will spell out.

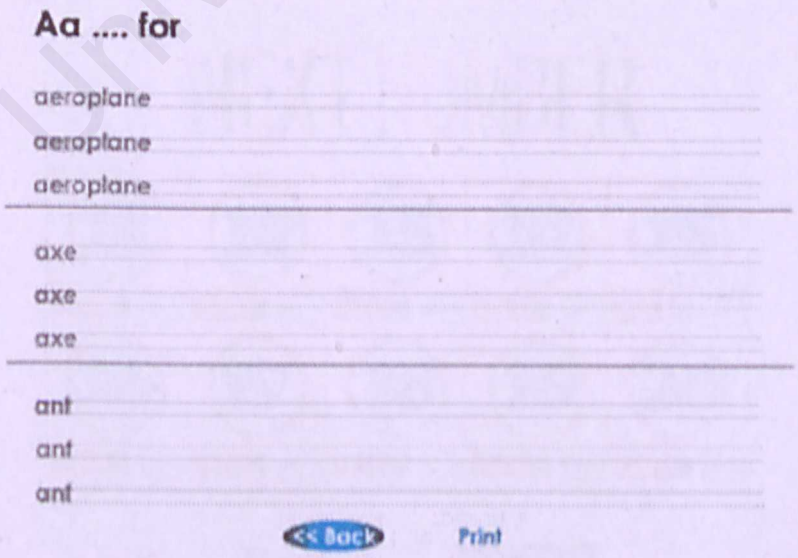

Figure 5-5: Page of alphabet examples print out method

- This is the print out method of the example for the alphabet.
- Print out button provided to allow this page print out for writing practice to the user.
- The system provides 3 examples of related image for each alphabet.

5.2 Number module

Figure 5-6: Numbers page for 1 to 10

Figure 5-7: Numbers page for 11 to 20

- This is the page which content number 1 to 20.
- Each number provides two functions, one is print out method and another one is a link to movie clip.

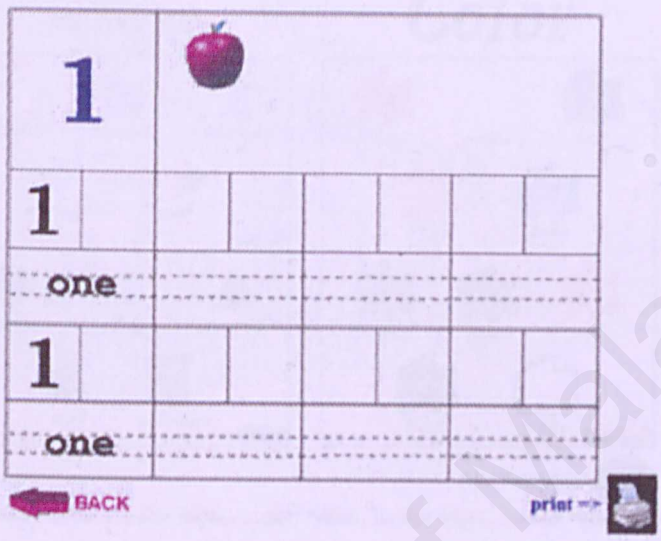

Figure 5-8: Numbers print out method's page

- This is the print out page for the number.
- Allow user print out the page and doing the writing practice.

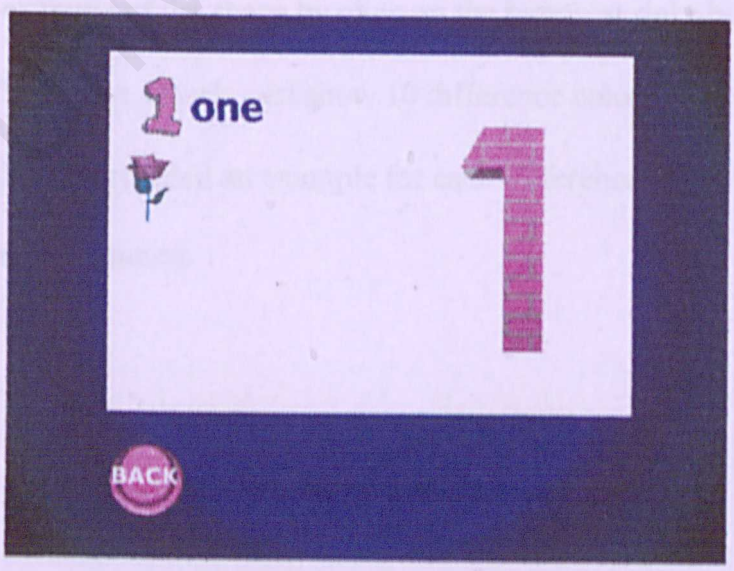

Figure 5-9: Movie clip for number's page

- A movie clip page for the number.

5.3 Shapes/Colors

Figure 5-10: Shape's and Color's page

- This page includes various shapes and colors.
- The shape's part separated in 2D and 3D shape, each part provided an example of the shape by click on the button at right-bottom corner.
- While the color's part show 10 difference colors.
- It also provided an example for each difference color by clicking the orange button.

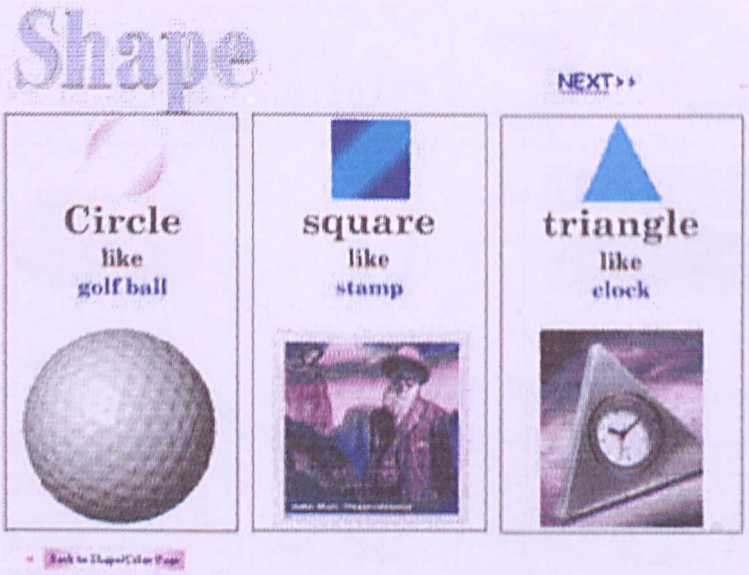

Figure 5-11: Example of 2D shape's page

- This is the example page for 2D shape.

Figure 5-12: Example of 3D shape's page

- This is the example page for 3D shape.

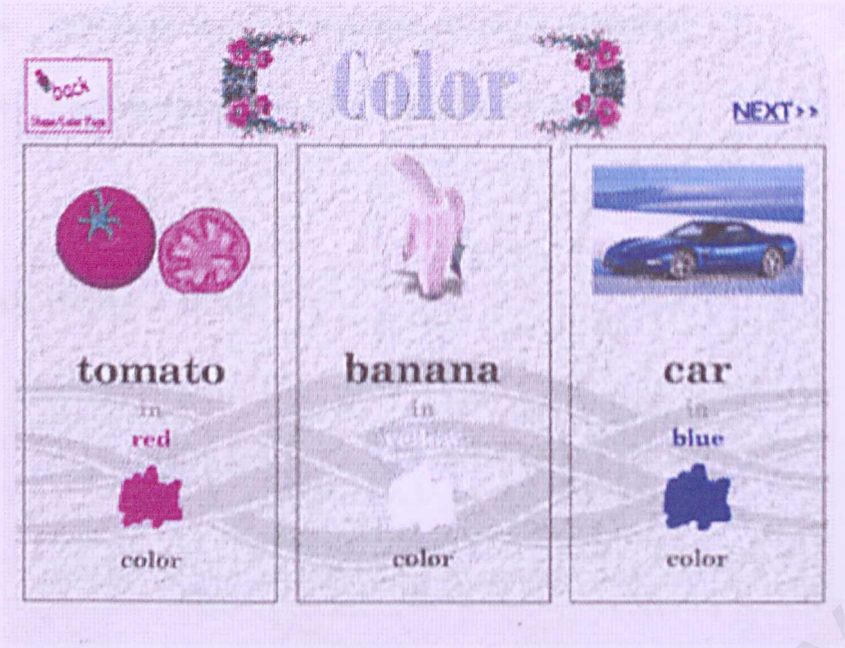

Figure 5-13: Example of color's page

- This is the example of color page.

5.4 Moral

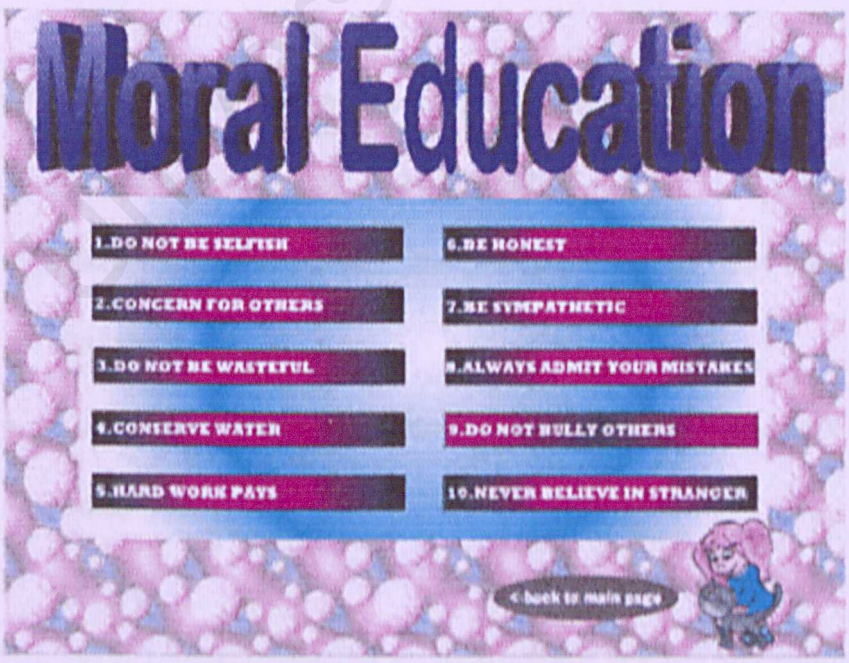

Figure 5-14: Moral's page

- This page show 10 example of moral education.
- Each example provided a short story of it.

5.5 Human Being's Body

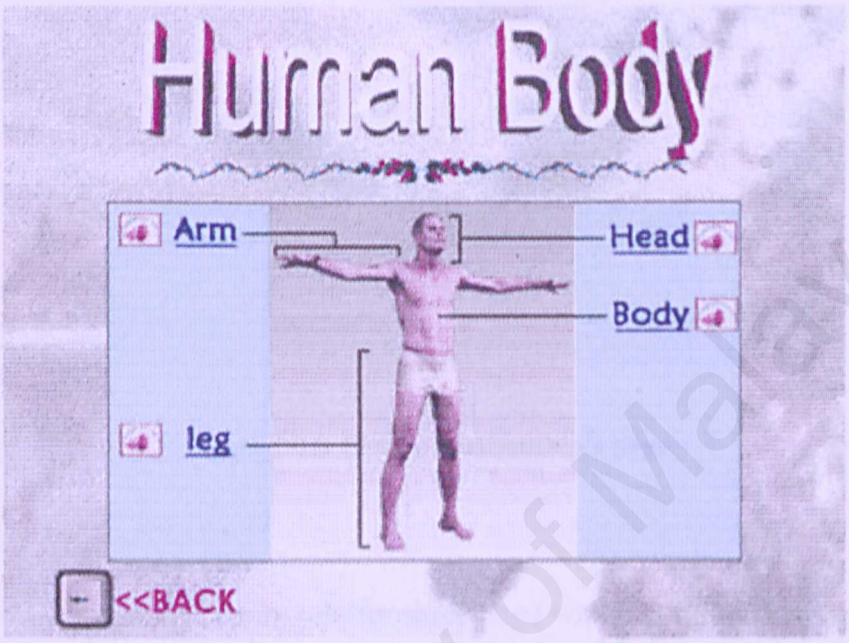

Figure 5-15: Human Being's Body's page

- This is the human being body page which includes 4 major buttons that are arm, leg, head and body button.
- When click on the button, the part of the human body that you clicked will show.
- The speaker image is a button that spell out the pronounce of that word.

5.6 Family Relationships

Figure 5-16: Family Relationship's page

- This is the family relationships page which contented two generation and three generation family relationship button.

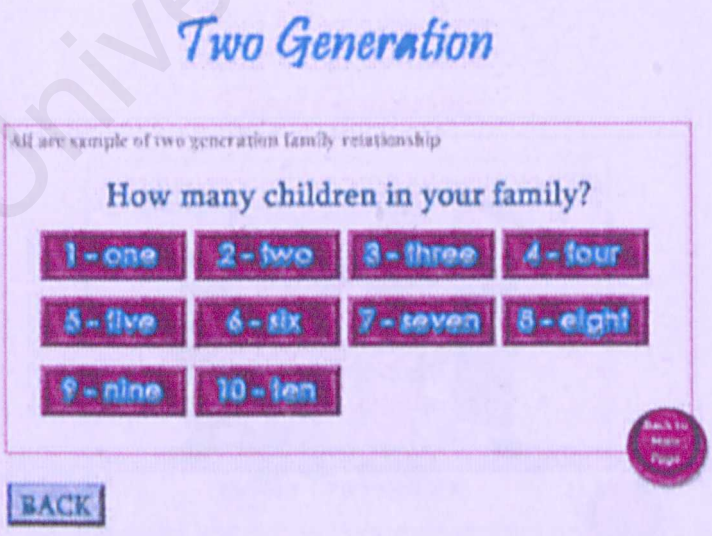

Figure 5-17: Example of two generation's page

- This is two generation page which had 10 examples of the number of children in a family.

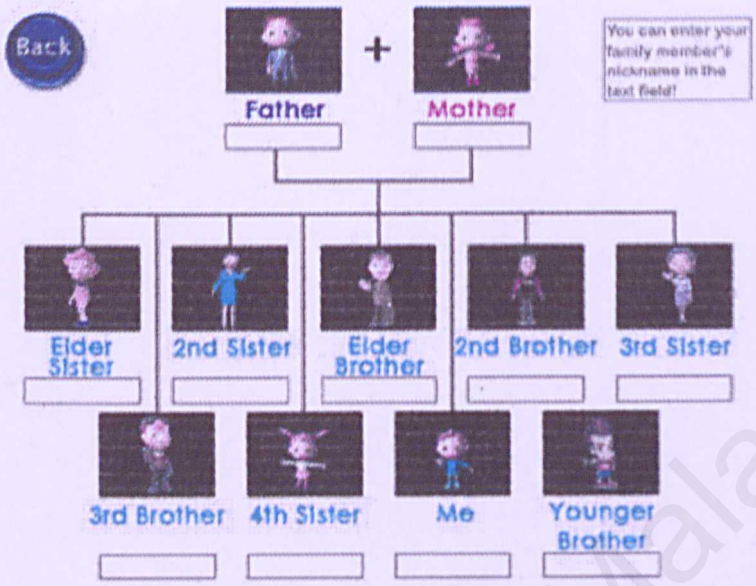

Figure 5-18: Page of two generation family relationship example

- This page shows the diagram of the examples of the number of children in a family.

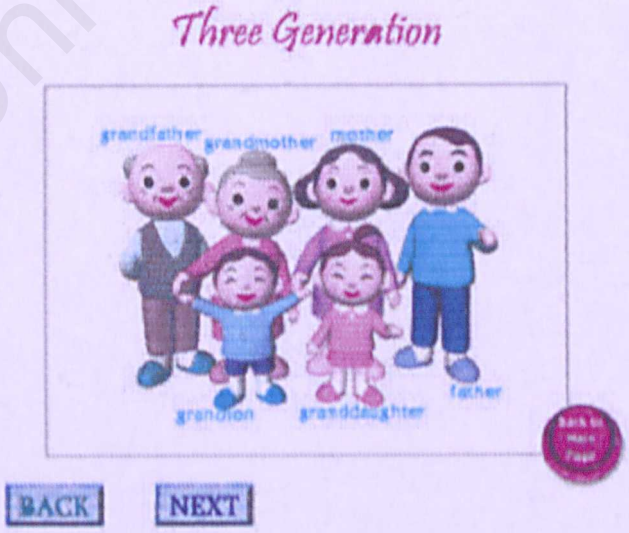

Figure 5-19: Three generation family relationship's page

- This is the example of three generation relationship.